

MASTER'S THESIS

Enterprise Architecture in a public sector Customs environment

A comparative stakeholder analysis on public sector challenges in managing an enterprise domain

Goos, J.

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Enterprise Architecture in a public sector Customs environment

A comparative stakeholder analysis on public sector challenges in managing an enterprise domain

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Abstract

The research question is how are enterprise architecture management processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing laws & legislation. Enterprise architecture is defined a state of affairs and enterprise architecture management as an activity, thereby interpreting enterprise architecture management as both product and process. Literature research identified recurrent public sector themes, such as law & legislation and continuity. The approach was a case study to gather qualitative data through in-depth interviews. Codes were assigned to transcripts, and through assigning stakeholders to classes, the concurrences of codes were comparatively analyzed. The results indicate the organization is IT driven, relies on informal procedures concerning architectural decisions and does not strategically address the translation of law & legislation into policy and its enforcement. Furthermore, the understanding of strategic objectives is not consistent over stakeholder groups.

Summary

The research question central to this thesis is *'how are enterprise architecture management processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law & legislation?'* The central theme therein is enterprise architecture management (EAM) in a public sector environment. The case study focuses on the enterprise architecture (EA) domain and its stakeholders that are collectively responsible for a set of business processes that enforce legislation applicable to excise products. There are four excise business processes that make up the EA domain. These are: excise declarations, excise refunds, excise transport movement and irregularities.

To answer the main research question, literature research was undertaken. It indicates that the definition of EA is ambiguous. Concerning EAM, results indicate that the potential to reach strategic objectives rests on the dissemination of this knowledge throughout the enterprise domain. After evaluation, research has concluded a differentiation is in order between the EA as a product (a state of affairs) and the EA as a process (the activity). The basis of EAM lies in the latter – the recognition that an EA requires processes that strategically direct it. Furthermore, results indicate that the public-private distinction is legitimate, due to different role of driving architectural factors such as continuity and law & legislation. An important link herein may be the extent of information fragmentation: If the cultural or technological exchange of information is distorted, different stakeholder perspectives are unlikely to be aligned.

This explains the thesis' main research question: *'How are enterprise architecture management processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law & legislation?'*. The research question has been broken down into three empirical questions:

1. How are driving public sector architectural demands incorporated in enterprise architecture management processes?
2. What is the role or impact of information fragmentation?
3. How are strategic projects and operational demands managed within the enterprise domain?

The set-up to reach a conclusion is a mono-method qualitative study¹. Because engagement is identified as central to EAM, a case study research approach has been chosen. This requires qualitative data, which has been collected through in-depth interviews held and transcribed in Dutch. Concerning the interviews, the stakeholder analysis is important. Four organizational classes were involved:

- The Regional Offices: Operational processes;
- Customs National Office: Law & legislation;
- Customs National Office: Strategy;
- Integrated Business Services: IT department;

To each stakeholder class, two interviewees were assigned. The interviews have been fully transcribed in Dutch. Variables and indicators were for the most part derived from the concepts that originated in the literature research, enabling a path traceable from start to end and vice versa. The coding results were analyzed and results derived on the basis of concurrences, whereby an additional advantage was derived from the manner of stakeholder class assignment: The same questions can be comparatively analyzed.

¹M. Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

Concerning the first research question, public sector architectural demands are insufficiently incorporated into the EAM process. Law & legislation is a go or no-go principle with insufficient control over system design and its impact. Continuity is a driving force, but too imbedded in technical IT debt for strategic EAM purposes.

Concerning the second research question, the exchange of information between organizational units is not efficient, because employees lack awareness of who is responsible for what. After IT project initiation, ownership is a problem due to the large number of teams involved. Technological information fragmentation is perceived as an issue, but is being addressed by the projects. However, from an architectural point of view, the lack of design authorities is perceived as a risk.

Concerning the third research question, strategic projects are largely initiated by the strategic unit of the Customs National Office and the IT department. Continuity drives new projects, even though officially these ought to be initiated to achieve specific strategic objectives. After project initiation management, the IT department takes over strategic management. Operational demands are coordinated by the IT department, with the other remaining engaged party being the regional offices. Coordinating operational demands is an informal process for which no standard process exists.

The results indicate the perception of EAM differs depending on the role of the interviewee within the organization. The same can be said of engagement with EAM. Themes identified as public sector themes do indeed show up, but in terms of architectural driving forces, these do not seem to play the conscious role one would expect given their central role. Rather, the technocratic nature of managing the organization seems a result of happenstance, resulting from well-established networks that lack an institutional fiat. This trend is also visible in much of the results that center around the fragmented nature of information, which in terms of culture is primarily a communication concern, and in terms of IT a lack of technological oversight through architectural design authorities.

How are enterprise architecture management processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law & legislation?

From strategic point of view, the Customs case study organization has an institutionalized structure to govern its enterprise architecture management processes. A key principle herein is that the business is in the lead, but this simultaneously points to the problem, because ownership in terms of processes and problems is identified as the greatest problem in relation to both strategic and operational enterprise architecture management. This is reflected in the results of what drives new EA initiatives: Only two candidates were identified, law & legislation and continuity. Only the latter proved of any input. This aspect of continuity mirrors problems frequently encountered in public sector organizations. It is most aptly described as technocracy, because the organization is driven by what is either desirable or necessary from a technological point of view, not through what innovation, legal principles or the external stakeholders require. Especially law & legislation are of concern here. Although from a strategic point of view the law unambiguously states what is and what is not legal, stakeholders in operational processes that must enforce the law have an altogether different perception of what this means. This interpretative gap bears an immediate link to information fragmentation. In managing an EA, the dissemination of strategy throughout the organization is of great importance, but a shared meaning of these objectives is lacking.

Content

List of figures	1
List of tables	2
1. Introduction.....	3
1.1 Enterprise architecture.....	3
1.2 Problem statement.....	4
1.3 Research objective	4
1.4 Relevance	5
1.5 Research questions.....	5
1.6 Conceptual approach	6
2. Literature review	8
2.1 Search terms and criteria	8
2.2 Literature review: Selection	8
2.3 Literature review: Results	11
2.4 Literature review: Evaluation	14
2.5 Research model.....	15
3. Research framework	17
3.1 Research philosophy	17
3.2 Research itinerary.....	18
3.3 Research methodology.....	18
3.4 Data collection and analysis	19
3.5 Validity and reliability.....	19
4. The EA domain and stakeholders.....	21
4.1 Determining the EA domain	21
4.2 Stakeholders of the EA domain	23
4.3 Variables and indicators	25
4.4 Collecting empirical data	26
5. Results and discussion.....	28
5.1 Additional information on interviews	29
5.2 Analysis and coding	29
5.3 Examples of coding.....	29
5.4 Qualitative results and quantification of results.....	31
5.5 Reflection on results.....	39
6. Conclusions and Recommendations	39
6.1 Main research question.....	39
6.2 Reliability and validity	40

6.3 Guide to further research.....	41
7. Reflection.....	42
Appendix A: Business process architecture.....	43
Appendix B: Epic value statements	45
Appendix C: Stakeholders.....	51
Appendix D Framework document for guiding interview	54
Appendix E: Strategic objectives	56
Appendix F: Frequency and correlation of codes.....	58
Appendix G: Text segments by code	60
Appendix H: Interviews	60
Appendix I: Glossary	60

List of figures

- Figure 1: Global research itinerary
- Figure 2: Research model
- Figure 3: Research steps from theory to execution
- Figure 4: Operationalizing the research model, step 1
- Figure 5: Clarkson et al: Stakeholder organization
- Figure 6: Mitchell et al Stakeholder classification
- Figure 7: Operationalizing research model, step 2
- Figure 8: Variables and expected indicators
- Figure 9: Full operational research model
- Figure 10: The variables and their expected indicators
- Figure 11: Splitting laws and legislation
- Figure 12: EA as a process: Strategic and operational
- Figure 13: Information fragmentation: Technical vs. Cultural
- Figure 14: EAM as operational
- Figure 15: EA as product

List of tables

Table 1: Description of the global research itinerary
Table 2: Search terms by research question
Table 3: Literature study search refinement criteria
Table 4: Search refinement research question 1
Table 5: Search results research question 1
Table 6: Search refinement research question 2
Table 7: Search results research question 2
Table 8: Search refinement research question 3
Table 9: Search results research question 3
Table 10: Search refinement research question 4
Table 11: Search results research question 4
Table 12: Description of figure 2
Table 13: Research approaches
Table 14: The itinerary for the analysis of interview results
Table 15: The strategic objectives relevant to the enterprise domain of excise processes
Table 16: Stakeholders roles applicable for interview selection
Table 17: Description of variables and indicators
Table 18: Description of full operational research model
Table 19: Examples of interview questions per variable
Table 20: Example of variable EA as a process for the strategic scenario
Table 21: Example of variable EA as a process for the operational scenario
Table 22: Example of variable Public Sector for law & legislation
Table 23: Example of variable Interoperability for the technical indicator
Table 24: The codes with the most frequent concurrences and the number of concurrences between these codes
Table 25: The variable law & legislation split into its indicators
Table 26: The integration of laws & legislation in relation to strategic governance structures
Table 27: The integration of law & and legislation in relation to operational governance structures
Table 28: Public Sector theme- continuity refined
Table 29: The indicators for information fragmentation
Table 30: Information fragmentation and information systems
Table 31: Information fragmentation by cultural causes
Table 32: Ownership and information fragmentation
Table 33: The perception of the nature of EAM: Strategic or operational
Table 34: Stakeholder perception of how and why the epics contributed to the strategic objectives

1. Introduction

Since the referendum in the United Kingdom, the *Brexit* has become a near unavoidable phenomenon. How different the sentiment was when Thatcher in her 1988 opening speech on the European Single Market addressed the British people to think of participation in a '*single market without barriers- visible or invisible.*' as an opportunity. The single market, from an architectural point of view, can be viewed as the enterprise – a complex, bold undertaking – of 500 million Europeans.

The reality of a single market without barriers – visible or invisible – has never been achieved. Whereas European Union (EU) member states have converged to reach a common policy on external border management, achieving similar results in duties and taxes quickly results in polarized arguments on nation-state sovereignty, firmly rooted in the principle of subsidiarity. One such example is the manner in which European countries handle excise. What counts as an excise product is determined by a European Council Directive², however excise law is national law. Although minimal EU-wide tariffs apply, every EU member state is free to determine its applied tariffs so long as the threshold is met. Every country is also responsible for levying these duties. Because these are levied in the country where the goods are taken out of stock, the consequence was a system that monitors the production, stock-levels and transport of excise goods through declarations, permits and a European-wide monitoring system for goods under suspension.

In case of the Netherlands, Dutch Customs is responsible for levying these duties and monitoring the logistical events that result from goods transported under suspension. With nearly 14 billion Euros levied annually, excise duties make up well over 90% of the total revenue stream. Given the organization's strategic goal in this domain is to '*promote remittances*', it can safely be called a critical process. It also gives good grounds to take stock of the Enterprise Architecture (EA) responsible for these processes. The few preceding paragraphs already hint at the complexity of an interplay of interests and processes on a national and international level. This research paper investigates how a public sector organization manages its EA, engages with its stakeholders on different levels and what role law & legislation plays therein.

1.1 Enterprise architecture

There is a difference between an EA – which is a state of affairs – and managing an EA – which is an activity. The focus of this research paper is the interplay between the two. The roots of such an organic view on EA are a brain-child of former IBM employee John Zachman. The first theoretical grounding was a two-dimensional framework that focused on ordering and qualifying an organization's information and data. His model was a long way from the strategic initiatives that moved from advising-participating towards participating managing³, but a beaten path needs a pioneer.

Regardless of the specifics of any given theoretical interpretation, EA as a discipline has some common philosophical features. Although frequently associated with information technology, EA goes beyond and above mere IT solutions. EA recognizes that such solutions are a means to an end and that the key

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1456138665149&uri=CELEX:02008L0118-20140101>

³ Ahlemann, F., Stettiner, E., Messerschmidt, M., & Legner, C. (Eds.). (2012). *Strategic enterprise architecture management: challenges, best practices, and future developments*. Springer Science & Business Media.

to success is found in strategic alignment between the different business layers, including IT. The existential justification is applying order⁴, while avoiding complexity devoid of practical purpose⁵.

Strategic alignment between business and IT is at the heart of successfully moving towards managing an EA, because environmental factors change continuously. Effectively, a successful move towards a managed EA allows an organization to respond appropriately. However, what is theoretically evident, is not always practically viable.

1.2 Problem statement

A public sector organization in a Customs environment is redesigning its information systems (IS) and processes in the excise domain. This requires business-IT alignment wherein stakeholder engagement plays a key role in strategic management. Matching the available information in, over and between IS and processes is a central challenge. In this research this problem is captured under the notion of information fragmentation, which has as cultural and technical perspective.

Cultural because of the diverse interests of internal stakeholders: Excise products are identified by the European Council. The requirements for monitoring the transport of excise products are defined by the European Commission. Excise law, however, is applied nationally, which leads to a triangle of responsibilities concerning translating legal principles into policy, the enforcement of that policy and the support of policy enforcement with IS. Different offices and actors have different interests that must continuously be aligned.

Technical because in so doing, the organization heavily relies on information systems. As recognized by the European Commission, the large variation in duty levels between Member States *'provides a strong incentive for tax evasion'*⁶: Problems arise from organization- and information fragmentation. For instance through the inability to match available logistical information to excise declarations based on logistical events, or by failing to link the information flow of internal business processes that supervise and enforce compliance of businesses with excise law.

On this basis, two main dimensions can be identified: How Dutch law realizes EU legal principles and how, a public sector organization shapes its domain, processes and information systems accordingly.

1.3 Research objective

A public sector organization is developing new information systems to reshape and support excise processes. Four processes have been preliminary identified as part of this excise domain: Declarations, transport movements, refunds and irregularities. This thesis analyses how the enterprise manages its architecture to align its business with IT through several projects that contribute to strategic objectives. Two specific themes are central to this. The first are recurrent themes in public sector enterprise architecture management (EAM). The second is the role of information fragmentation by identifying and analyzing what this means to different key stakeholders of the organization.

⁴ Lapalme, J., Gerber, A., Van der Merwe, A., Zachman, J., De Vries, M., & Hinkelmann, K. (2016). Exploring the future of enterprise architecture: A Zachman perspective. *Computers in Industry*, 79, 103-113.

⁵ Ahlemann, F., Stettiner, E., Messerschmidt, M., & Legner, C. (Eds.). (2012). *Strategic enterprise architecture management: challenges, best practices, and future developments*. Springer Science & Business Media.

⁶ https://ec.europa.eu/taxation_customs/sites/taxation/files/25_05_2018_proposal_excise_duties_alcohol.pdf

The scope of this research paper is limited and focuses only on those aspects which can be addressed by internal changes in the EA. However, the research results may potentially serve as a vantage point to a comparative analysis of the competitive nature⁷ of excise taxes between EU member states.

1.4 Relevance

Theoretical relevance

Few theoretical analyses are specifically focused on public sector projects⁸ and on the theoretical implications for the prevalent private / public distinction. Theoretical relevance of research can be derived from the fact an entire EA-domain is targeted, from which crucial stakeholders engaged in managing business-IT alignment are involved, including those responsible for maintaining legal requirements⁹.

Practical relevance

The practical relevance lies in taking stock of the processes of enterprise architecture management that translate strategy into practical solutions and identifying public sector bottlenecks concerning the attention and priority of operational stakeholder demands.

1.5 Research questions

This research paper aims to answer the following question:

How are enterprise architecture management processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law & legislation?

To answer the research question, a literature research is undertaken to build a theoretical framework. Four theoretical questions structure this. These are:

1. What is Enterprise architecture?
2. What is Enterprise architecture management?
3. What are characteristic challenges of Enterprise Architecture Management in the public sector?
4. What role does information fragmentation play in Enterprise Architecture Management?

After these questions are answered, the results are evaluated. The evaluation is used to outline how the empirical research builds on the prior research.

Three empirical sub-research questions are defined in order to answer the main research question. These are:

1. How are driving public sector architectural demands incorporated in EAM processes?
2. What is the role or impact of information fragmentation?

⁷ https://www.telegraaf.nl/nieuws/1086256/twee-jaar-cel-voor-fraude-met-bieraccijns?utm_source=google&utm_medium=organic

⁸ Dang, D. D., & Pekkola, S. (2017). Systematic Literature Review on Enterprise Architecture in the Public Sector. *Electronic Journal of e-Government*, 15(2).

⁹ Hans Scholl, Herbert Kubicek, Ralf Cimander. Interoperability, Enterprise Architectures, and IT Governance in Government. Marijn Janssen; Hans J. Scholl; Maria A. Wimmer; Yao-hua Tan. 10th Electronic Government (EGOV), Aug 2011, Delft, Netherlands. Springer, Lecture Notes in Computer Science, LNCS-6846, pp.345-354, 2011, Electronic Government.

3. How are strategic projects and operational demands managed within the enterprise domain?

The theoretical and empirical questions are modelled in the research model. The interview results are placed within this research framework in chapter 3. In chapter 4, the EA domain and its stakeholders are identified and analyzed. In chapter 5, results and discussions are presented. In chapter 6, the conclusions and recommendations are offered. Chapter 7 offers reflections on research.

1.6 Conceptual approach

As outlined above, literature research precedes empirical research. These are the first four research questions, displayed in red in figure 1 below. These are followed by the three empirical research questions, indicated in orange in figure 1 below. These are followed by results, conclusions, recommendations and reflection, indicated in yellow in figure 1 below.

Research follows the itinerary as displayed in the research model below and corresponding table (figure 1; table 1).

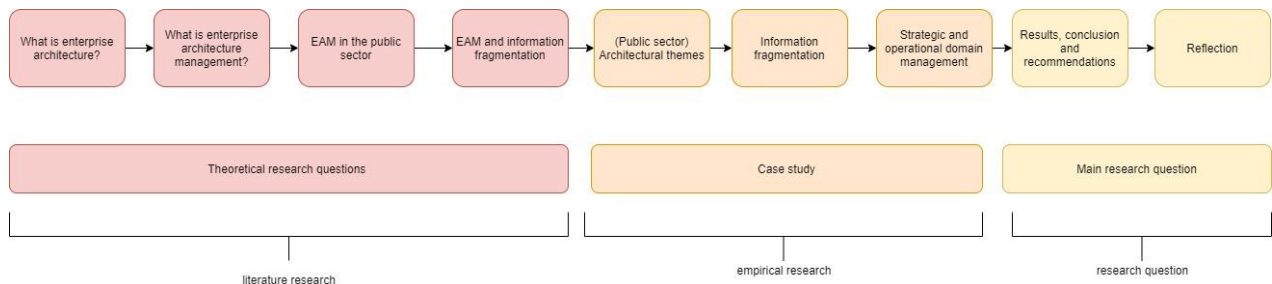


Figure 1: Global research itinerary

Stage of research	Specification of stage of research	Description of activities
Theoretical research questions through literature research	Research question 1	Through the literature study, answering the research question 'what is enterprise architecture?'
	Research question 2	Through the literature study, answering the research question 'what is enterprise architecture management?'
	Research question 3	Through the literature study, answering the research question 'what are characteristic challenges of Enterprise Architecture Management in the public sector?', so that recurrent themes may be identified
	Research question 4	Through the literature study, answering the research question 'what role does information fragmentation play in enterprise architecture?'

Case study through empirical questions	Empirical research question 1	Through empirical research, answer the research question: How are driving public sector architectural demands incorporated in EAM processes?
	Empirical research question 2	Through empirical research, answer the research question: What is the role or impact of information fragmentation?
	Empirical research question 3	Through empirical research, answer the research question: How are strategic projects and operational demands managed within the enterprise domain?
	Main research question	On the basis of results, come to conclusions and recommendations and answer the main research question: <i>'How are enterprise architecture governance processes in a public sector Customs environment organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law & legislation?'</i>

Table 1: Description of the global research itinerary

2. Literature review

2.1 Search terms and criteria

To find relevant literature, each research question was targeted on the basis of table 2 below. Each research question is listed with its corresponding 'phase research model' (from the research model, figure 1 above), search term and combination terms.

Research question	Phase research model	Search term(s)	In combination with
1	Desk research	Definition	Enterprise Architecture
2	Desk research	Management	Enterprise Architecture
3	Desk research	Interoperability	Enterprise Architecture Management
4	Desk research	Public sector	Enterprise Architecture

Table 2: Search terms by research question

To the search results incremental criteria are applied. This refinement per research question is done through applying six steps. Table 3 lists each step, corresponding action and explanation.

Step	Action	Explanation
1	Search engine: Google scholar	High capacity; wide reach; free of charge.
2	Year of publication: 1980	The year of publication is set to 1980, just prior the emergence of Enterprise Architecture as a field of study.
3	Search criteria: In title	To increase result relevance, texts were targeted specifically focused on the topic at hand.
4	Search results: Relevance	Only texts relevant on the basis of citation ranking were selected (with a minimum set at 25).
5	Search results: Analysis	Search results were analyzed to assess relevance to research topic.
6	Analysis: Results	The selected texts are used to answer the research questions.

Table 3: Literature study search refinement criteria

2.2 Literature review: Selection

In this section, each paragraph is dedicated to finding and selecting literature for each theoretical research questions on the basis of the search terms and criteria introduced above.

2.2.1 Research question 1: What is enterprise architecture?

Result refinement step	Activity	Number of hits
1	Search engine: Google scholar	2.090.000
2	Year of publication: 1980	16.700
3	Search criteria: In title	30
4	Search results: Relevance	8
5	Search results: Analysis	7
6	Analysis: Results	6

Table 4: Search refinement research question 1

Result	Reference	Link
1	Rood, M. A. (1994, April). Enterprise architecture: definition, content, and utility. In <i>Proceedings of 3rd IEEE Workshop on Enabling</i>	Link

	<i>Technologies: Infrastructure for Collaborative Enterprises</i> (pp. 106-111). IEEE.	
2	Zachman, J. A. (1987). A framework for information systems architecture. <i>IBM systems journal</i> , 26(3), 276-292.	Link
3	Kang, D., Lee, J., Choi, S., & Kim, K. (2010). An ontology-based enterprise architecture. <i>Expert Systems with Applications</i> , 37(2), 1456-1464.	Link
4	Lapalme, J., Gerber, A., Van der Merwe, A., Zachman, J., De Vries, M., & Hinkelmann, K. (2016). Exploring the future of enterprise architecture: A Zachman perspective. <i>Computers in Industry</i> , 79, 103-113.	Link
5	Shanks, G., Gloet, M., Someh, I. A., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. <i>The Journal of Strategic Information Systems</i> , 27(2), 139-156.	Link
6	Saint-Louis, P., Morency, M. C., & Lapalme, J. (2019). Examination of explicit definitions of enterprise architecture. <i>International Journal of Engineering Business Management</i> , 11, 1847979019866337.	Link

Table 5: Search results research question 1

2.2.2 Research question 2: What is enterprise architecture management?

Result refinement step	Activity	Number of hits
1	Search engine: Google scholar	2.160.000
2	Year of publication: 1980	841.000
3	Search criteria: In title	831
4	Search results: Relevance	42
5	Search results: Analysis	9
6	Analysis: Results	3

Table 6: Search refinement research question 2

Result	Reference	Link
1	Simon, D., Fischbach, K., & Schoder, D. (2014). Enterprise architecture management and its role in corporate strategic management. <i>Information Systems and e-Business Management</i> , 12(1), 5-42.	Link
2	Ahlemann, F., Stettiner, E., Messerschmidt, M., & Legner, C. (Eds.). (2012). <i>Strategic enterprise architecture management: challenges, best practices, and future developments</i> . Springer Science & Business Media.	Link
3	Jonkers, H., Lankhorst, M. M., ter Doest, H. W., Arbab, F., Bosma, H., & Wieringa, R. J. (2006). Enterprise architecture: Management tool and blueprint for the organisation. <i>Information systems frontiers</i> , 8(2), 63-66.	Link

Table 7: Search results research question 2

2.2.3 Research question 3: What are characteristic challenges of EAM in the public sector?

Result refinement step	Activity	Number of hits
1	Search engine: Google scholar	421.000
2	Year of publication: 1980	141.000

3	Search criteria: In title	45
4	Search results: Availability	6
5	Search results: Analysis	6
6	Analysis: Results	3

Table 8: Search refinement research question 3

Result	Reference	Link
1	Dang, D. D., & Pekkola, S. (2017). Systematic Literature Review on Enterprise Architecture in the Public Sector. <i>Electronic Journal of e-Government</i> , 15	Link
2	Larsson, H. (2011, August). Ambiguities in the early stages of public sector enterprise architecture implementation: outlining complexities of interoperability. In <i>International Conference on Electronic Government</i> (pp. 367-377). Springer, Berlin, Heidelberg.	Link
3	Kaushik, A., & Raman, A. (2015). The new data-driven enterprise architecture for e-healthcare: Lessons from the Indian public sector. <i>Government Information Quarterly</i> , 32(1), 63-74.	Link
4	Lemmetti, J., & Pekkola, S. (2012, September). Understanding enterprise architecture: perceptions by the finnish public sector. In <i>International Conference on Electronic Government</i> (pp. 162-173). Springer, Berlin, Heidelberg.	Link
5	Dang, D. D., & Pekkola, S. (2016). Root Causes of Enterprise Architecture Problems in the Public Sector. <i>PACIS</i> , 287.	Link

Table 9: Search results research question 3

2.2.4 What role does information fragmentation play in EAM?

Result refinement step	Activity	Number of hits
1	Search engine: Google scholar	242.000
2	Year of publication: 1980	54.100
3	Search criteria: In title	5
4	Search results: Availability	3
5	Search results: Analysis	3
6	Analysis: Results	2

Table 10: Search refinement research question 4

Result	Reference	Link
1	Chen, D., Doumeingts, G., & Vernadat, F. (2008). Architectures for enterprise integration and interoperability: Past, present and future. <i>Computers in industry</i> , 59(7), 647-659.	Link
2	Ghani, I., Lee, C. Y., Juhn, S. H., & Jeong, S. R. (2010). Semantics-oriented approach for information interoperability and governance: towards user-centric enterprise architecture management. <i>Journal of Zhejiang University Science C</i> , 11(4), 227-240.	Link

Table 11: Search results research question 4

2.3 Literature review: Results

2.3.1 What is enterprise architecture?

Enterprise Architecture cannot unambiguously be defined, as the meaning of the concept is determined to what it refers to. Patrick Saint-Louis et al¹⁰ focus specifically on tackling this issue, offering three interpretive definitions of EA: (1) *'the IT unit's contribution to successful execution of a firm's dominant logic'*; (2) *a comprehensive description of all key elements and relationships that constitute an organization*; and (3) *promising means to align required changes in corporate strategy and business processes with an increasingly complex IT landscape*.

In terms of EA as a model for businesses, however, identifying key elements and relationships is not sufficient in achieving benefits. Shanks et al¹¹ argue that to achieve business and IT alignment, the required dynamic interaction with the environment can be achieved through, among others, service capability, stakeholders participation and (IT) governance.

Conclusion: Enterprise Architecture is a broad term. In order for it to meaningfully applied, dynamic interaction with the environment is key. Restricting its definition to IT only is counterproductive. EA is therefore defined as promising means in strategically aligning desired business changes through IT solutions.

2.3.2 What is enterprise architecture management?

Effectively, Shanks et al¹² point towards the inherent managerial capacity an organization requires to have its EA aid in achieving benefits. There is no common understanding between enterprise architecture and enterprise architecture management. However, as Löhe and Legner argue, the management and design orientation of EAM *'supports the transformation of the EA state of an enterprise into an intermediate and long-term to-be state'*¹³. This lack of a common understanding is corroborated by Simon and Fischbach¹⁴ in stating that EA and its role in cooperate strategic management continually faces *'difficulties bringing strategy to execution'*. They therefore developed a business architecture framework that supports the adoption of a new EA. Ahlemann et al¹⁵ take as their point of departure the strategic importance of managing the EA. They do so with a focus on architecture transparency, documented architecture vision and architecture principles and guidelines. And although not all enterprises will reap the benefits instantly, this is the most effective route towards a form of organizational modularization – therewith stressing the important role of IT. Similarly, Jonkers et al¹⁶ stress the duality of EA, denoting it both *'process as well as product'*.

In scoping what it is to manage an enterprise, architecture vision and documentation are important. But whereas organizational structures and metrics are well established in corporate and IT governance

¹⁰ Saint-Louis, P., Morency, M. C., & Lapalme, J. (2019). Examination of explicit definitions of enterprise architecture. *International Journal of Engineering Business Management*, 11, 1847979019866337.

¹¹ Shanks, G., Gloet, M., Someh, I. A., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. *The Journal of Strategic Information Systems*, 27(2), 139-156.

¹² Shanks, G., Gloet, M., Someh, I. A., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. *The Journal of Strategic Information Systems*, 27(2), 139-156.

¹³ Löhe, J., & Legner, C. (2014). Overcoming implementation challenges in enterprise architecture management: a design theory for architecture-driven IT Management (ADRIAM). *Information Systems and e-Business Management*, 12(1), 101-137.

¹⁴ Simon, D., Fischbach, K., & Schoder, D. (2014). Enterprise architecture management and its role in corporate strategic management. *Information Systems and e-Business Management*, 12(1), 5-42.

¹⁵ Ahlemann, F., Stettiner, E., Messerschmidt, M., & Legner, C. (Eds.). (2012). *Strategic enterprise architecture management: challenges, best practices, and future developments*. Springer Science & Business Media.

¹⁶ Jonkers, H., Lankhorst, M. M., ter Doest, H. W., Arbab, F., Bosma, H., & Wieringa, R. J. (2006). Enterprise architecture: Management tool and blueprint for the organisation. *Information systems frontiers*, 8(2), 63-66.

*'comparable structures for EA governance are still in their infancy'*¹⁷. For keeping tabs on the product, the Open Group released its first Architecture Framework (9.1) in 1995 under the name TOGAF. The framework is partially built on and deduced from the Technical Architectural Framework for Information Management. Characteristic of the TOGAF is its orientation on design, planning, implementing and controlling an enterprise information technology architecture. The framework recognizes the business, application, data and technical layer. In 2008, the ArchiMate tool was handed over to the Open Group which integrated it into TOGAF9. ArchiMate is an enterprise architecture modelling language supporting description, analysis and visualization. The combination of TOGAF and ArchiMate creates a theoretically sound, practically tested synthesis¹⁸.

Conclusion: The role of IT is important. Transparency of the architecture must therefore be managed through documentation, principles and guidelines. TOGAF and Archimate offer the framework, syntax and semantics to enable an organization to achieve this. Having established defining the EA as ambiguous, declaring this product side of the EA does not go far enough. The basis of EAM lies in the recognition that the EA's dual nature makes it a process and product. Combining the transparency of an architecture can best be achieved by having the EA as a process result in a combined product – validated documentation and IT solutions built thereupon. However, the goal is to bring strategy to execution: An EA that is to be managed must implement the processes that make this goal achievable.

2.3.3 What are characteristic challenges of EAM in the public sector?

Simon and Fischbach, Ahlemann et al and Jonkers et al (referred to above) have one thing in common: The focus of their research and analysis is on the cooperate, private sector. Public sector organizations are often less flexible and agile. Hylving et al¹⁹ argue for more nuance, splitting possible routes into three strands: (1) active compliance with EAM strategy, (2) loyal but passive response and (3) rebel solutions. Analogous to these possible routes, they point out that, an under-researched aspect of EAM is *'how different organizational units responds to the call for a holistic approach'*. In their systematic literature review of public sector EA's, Dang and Pekkola provide depth to what holistic approaches may include, concluding public sector²⁰ institutions often have to follow more complex paths²¹. Accountability and continuity play a different role in a landscape where law & legislation can be driving architectural-design choices²².

A major risk that stems from organizational complexity is 'silo formation', i.e. in modern management linguistics *'a system, process, department, etc., that operations in isolation from others'*²³. The purpose of EA and, especially, enterprise architecture management, is to address the organizational culture and practice that enables and maintains these silo structures. Frequently, IT is a driving-force behind change-initiatives, but at the same time IT 'solutions' cause the fragmentation that is implicitly being addressed. Chen et al²⁴ argue along similar lines, stating EA has become popular in the public sector but *'researchers*

¹⁷ Winter, R., & Schelp, J. (2008). Enterprise architecture governance: The need for a business-to-IT approach. Paper presented at the 548-552. doi:10.1145/1363686.1363820

¹⁸ ArchiMate® 3.0.1 Specification. (z.d.). Consulted on 2nd of May 2019, on <http://pubs.opengroup.org/architecture/archimate3-doc/>

¹⁹ Hylving, L., & Bygstad, B. (2018, January). Responding to Enterprise Architecture Initiatives: Loyalty, Voice and Exit. In *Proceedings of the 51st Hawaii International Conference on System Sciences*.

²⁰ Dang, D. D., & Pekkola, S. (2017). Systematic Literature Review on Enterprise Architecture in the Public Sector. *Electronic Journal of e-Government*, 15(2).

²¹ Hans Scholl, Herbert Kubicek, Ralf Cimander. Interoperability, Enterprise Architectures, and IT Governance in Government. Marijn Janssen; Hans J. Scholl; Maria A. Wimmer; Yao-hua Tan. 10th Electronic Government (EGOV), Aug 2011, Delft, Netherlands. Springer, Lecture Notes in Computer Science, LNCS-6846, pp.345-354, 2011, Electronic Government.

²² Julisch, K., Suter, C., Weitalla, T., & Zimmermann, O. (2011). Compliance by design—Bridging the chasm between auditors and IT architects. *Computers & Security*, 30(6-7), 410-426.

²³ Tett, G. (2015). *The silo effect: The peril of expertise and the promise of breaking down barriers*. Simon and Schuster.

²⁴ Chen, D., Doumeings, G., & Vernadat, F. (2008). Architectures for enterprise integration and interoperability: Past, present and future. *Computers in industry*, 59(7), 647-659.

have largely ignored this context [...] and quite little is known about how EA is developed, implemented, or adapted in different countries and the public sector’.

Conclusion: Enterprise architecture management in public sector organizations is built upon the foundations of experiences in the private sector. In order to substantiate claims, the role of law & legislation and continuity as architectural design choices are therefore expected to play an important role.

2.3.4 What role does information fragmentation play in EAM?

In defining and managing the EA, the description of key elements and relationships of an organization in addition to its role in aligning changes to strategy were underlined. The problem statement of this research paper speaks of information fragmentation. One vantage point to conceptually analyze this phenomenon is interoperability. Pardo et al. conclude interoperability is a means to an end, not necessity. However, systems ‘*must be inoperable to effectively meet citizens’ demands*’²⁵. They stipulate that interoperability is hard to realize because of an interplay in policy, management and technology dimensions.

The concept of interoperability can play a pivotal role in shifting from an as-is to a to-be EA, both through managing existing silos as well as preventing new ones from arising. Interoperability is distinct from interoperation. Interoperability specifically refers to a set of shared, adhered to standards that enables the smooth, unhindered exchange of information. Interoperation, on the other hand, can from that vantage point be seen as a form of non-managed, ad-hoc setup of components²⁶. Whereas the European Commission distinguishes technical, semantic and organizational interoperability²⁷, Schol et al.²⁸ discriminate between a business, semantic, syntactic and technical level of interoperability. From bottom to top (resp. technical to business), each layer requires the existence of interoperability in the lower layer.

The concept of interoperability is one that moves beyond IT as either cause or effect by taking organizational, social and political factors into account. Chen et al²⁹ identify three interoperability barriers: conceptual, technological and organizational. Conceptual barriers are concerned with syntactic and semantic differences in the information that is exchanged; technological barriers refer to the incompatibility of information technology; and organizational challenges refer to cultural aspects of ownership and responsibility³⁰.

Conclusion: Interoperability is a concept that fits well within the framework of EA(M), because of its focus on how concepts, technology and organizations communicate with one another. More specifically, it synthesizes the idea of fragmentation as a problem that is situated, irrelevant as to wherein or whereby it originates. In answering what its relation to EAM is, interoperability can hence be seen as a means to focus on shared interests in the same information. The approaches by Löhe and

²⁵ Pardo, T. A., Nam, T., & Burke, G. B. (2012). E-government interoperability: Interaction of policy, management, and technology dimensions. *Social Science Computer Review*, 30(1), 7-23.

²⁶ *Interoperation* - Wikipedia. (2019, May 28th). Consulted on 2nd of July 2019, on <https://en.wikipedia.org/wiki/Interoperation>

²⁷ European Commission, Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions: Towards interoperability for European public services. vol. COM, 12/16/2010 Brussels: European Commission, pp. 1–55 (2010)

²⁸ Hans Scholl, Herbert Kubicek, Ralf Cimander. Interoperability, Enterprise Architectures, and IT Governance in Government. Marijn Janssen; Hans J. Scholl; Maria A. Wimmer; Yao-hua Tan. 10th Electronic Government (EGOV), Aug 2011, Delft, Netherlands. Springer, Lecture Notes in Computer Science, LNCS-6846, pp.345-354, 2011, Electronic Government.

²⁹ Chen, D., Doumeingts, G., & Vernadat, F. (2008). Architectures for enterprise integration and interoperability: Past, present and future. *Computers in Industry*, 59(7), 647-659. doi:10.1016/j.compind.2007.12.016

Legner, focus on requirements between parties to become interoperable, instead of what each approach must entail on its own. To capture its broad nature, the role of interoperability in EAM is its framework to interpret, assess and address information fragmentation. In the context of this research paper, the cultural and technical aspect are of interest (the manner of organizing the organization being an aspect of culture).

2.4 Literature review: Evaluation

The literature research has several connected main trends:

1. The definition of EA is ambiguous, but environmental-engagement is required;
2. The relation between EA and EAM is that between a state of affairs and the effort invested to reach a different state of affairs;
3. EAM is about realizing strategy and its main challenge is to have such initiatives transform into the lower parts of the organization, without loss of information or purpose;
4. Research on public sector EA is built on private sector knowledge, and requires possible different environmental-engagement.
5. Information fragmentation can be captured through the notion of interoperability, in order to look at the exchange of information, irrespective whether this is cultural or technological;

Concluding, the empirical research must take as its departing point:

The definition of EA is ambiguous, but environmental-engagement is required. It is therefore paramount to answer who is involved in the EA domain processes, before questions concerning its management and potential (public sector) problems can be identified. Of the enterprise architecture domain, the key stakeholders must be identified, assessed and classified. Thereby the relationships (or lack thereof) and interests become clear and, after data collection, perspectives can be comparatively analyzed.

The potential to reach strategic objectives rests on the dissemination of this knowledge throughout the enterprise domain. A critical factor herein is that strategic objective are commonly understood to mean the same. Moreover, the enterprise's ability to achieve its strategic objectives is expected to be subject to themes recurrent in public sector environments. It is vital to identify and asses such themes, such as law & legislation and continuity. An important link herein may be the extent of information fragmentation: If the cultural or technological exchange of information is distorted, different stakeholder perspectives are unlikely to be aligned.

Hence to answer the main research question, a primary challenge is to identify the route towards a documented starting point. This is the starting point from which to disseminate strategy throughout the organization. It offers a foundation for the research question 'what EAM processes are responsible for the domain's strategic direction?'

The focus here lies on the interplay between EA as a process and EA as a (strategic) product:

- What stakeholders are responsible for strategic EA products?
- What other stakeholders are involved in EA products?
- Are the strategic objectives these products must realize commonly understood to mean the same?

This result becomes a starting point devolvment of EAM into lower organizational layers, without which EAM is not possible. The organization's main concern here is to remain engaged. It is important to

highlight the perception to what extent a stakeholder feels engaged in managing the EA domain. The focus lies on EA as a process:

- What stakeholders are involved in strategic domain management?
- What other stakeholders are involved?
- How is the extent of influence or engagement perceived?

Furthermore, literature research indicates limited material is available on public sector EAM. Although concepts of 'law & legislation' and 'continuity' are known driving architectural factors, it is by no means evident that their institutionalization into EAM is consistently applied.

The same is said of information fragmentation. That organizations struggle in coping with information system and process requirements is well known, but how they do so is environmentally determined. Furthermore, it is not unlikely fragmentation is common to both private and public sector EAM, giving the two a distinct common vantage point.

2.5 Research model

The first four desk research questions are answered. On the basis of the conclusion for each research question and evaluation, figure 2 illustrates the relation between the research question and subsequent application to stakeholder groups identified in later stages of this research. This model will reappear throughout this research, being a basis for stakeholder analysis and the application of variables.

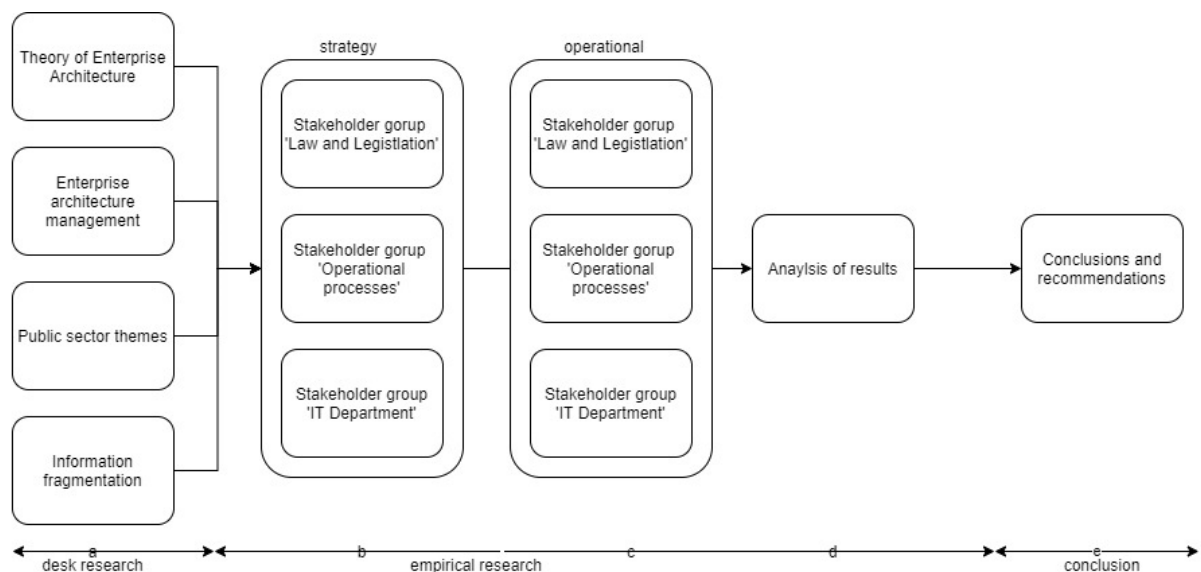


Figure 2: Research model

Stage	Description of stage
A – desk research	<p>Answers to the research questions. Resulted in concepts that can be applied in later stages as variables:</p> <ul style="list-style-type: none"> - EA as a process; - EA as a product; - Public sector themes; - Information fragmentation;

B – Empirical research	Interview questions concerned with the strategic aspects of EAM, structured around the concepts identified in A – <i>Desk research</i> .
C – Empirical research	Interview questions concerned with the operational aspects of EAM, structure around the concepts identified in A – <i>Desk research</i> .
D – Analysis of results	On the basis of B – <i>Empirical Research</i> and C – <i>Empirical Research</i> , correlations and concurrences are identified and analyzed, on the basis of variables and indicators. The variables and indicators are based on the concepts identified in A – <i>Desk research</i> .

Table 12: Description of research model

3. Research framework

In this chapter the research framework is set out, starting with the research philosophy. This is followed by the research itinerary and methodology, data collection and analysis and reliability and validity.

3.1 Research philosophy

Research is qualitative. Three reasons are offered in support of this choice:

1. The depth-interviews are time intensive, therefore low in numbers and ill-suited for quantitative analysis ;
2. The research question cross compares engagement in managing the EA;
3. The research questions cross compares recurrent bottlenecks and the perception of strategic objectives;

The set-up is therefore a mono-method qualitative study³¹. In terms of research phases, interpretivism³² is applicable. Saunders et al³³ argue for at least seven possible types of research. From these, only the qualitative options were selected due to the form of data collection. These are shown in table 13.

Method	Deductive / Inductive	Quantitative / qualitative
Action research	Inductive	Qualitative
Action research focuses on a combination of research and participating in achieving change, which would only be a viable option if the researcher were to partake in strategic processes. This is not the case, and therefore ruled out		
Archive research	Deductive / inductive	Qualitative
Archive research focuses on manuscripts, documents and records. It is therefore not an option due to the manner of collecting data.		
Ethnography	Inductive	Qualitative
Ethnography research requires the researcher to observe and or interact with participants of research programs. This was not possible.		
Case study	Inductive	Qualitative
Case study research focuses on in-depth phenomena of individuals or groups to explore underlying principles. It is applicable.		

Table 13: Research approaches

Case study research was selected as the most appropriate method, considering a) the necessity for archive research, b) in-depth interviews and c) the relation between the data and research question, that is concerned with drawing on different perspectives within a single horizon. The approach is inductive³⁴: There is no rigid methodology and the nature of the problems and solutions are to be identified and assessed. This is aligned with the research objective.

³¹M. Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

³² M. Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

³³ Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

³⁴ M. Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

3.2 Research itinerary

Building on the global research itinerary illustrated in figure 1 above, figure 3 below display the operational steps undertaken that go from theory, to stakeholders, data collection and analysis. The bullet points 1 to 4 below describe the figure.

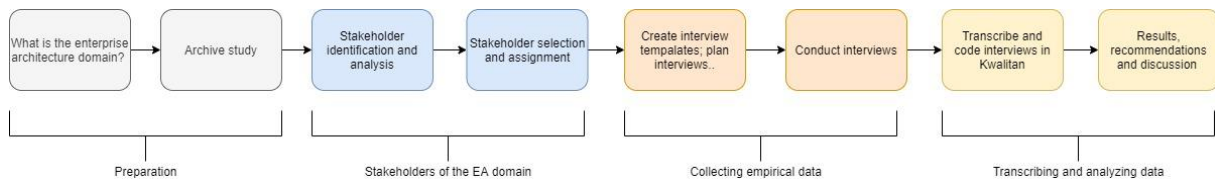


Figure 3: Research steps from theory to execution

1. **Preparation:** As literature research has indicated, engagement of stakeholders is key. Hence what must first be undertaken is a demarcation of the enterprise architecture domain of the case study. Hence the question 'what is (the) enterprise architecture' must be answered, so that stakeholder identification and analysis can be firmly rooted in organizational reality. What the EA is, is determined through archive study, with a primary focus on documentation that defines and limits the domain of excise processes.
2. **Stakeholders of the EA domain:** Through stakeholder identification and analysis it is determined who or what are stakeholders of the identified EA domain. All stakeholders are assigned to classes, so that a selection can be made to represent the stakeholder vantage points suited to answer the empirical research questions. These vantages points are 'law & legislation, operational and IT'.
3. **Collecting empirical data:** Having identified the stakeholders, a generic interview template is created. Because the stakeholders have different roles, this interview template is enhanced with questions expected to be specific to the different vantage points. The interviews are then planned and conducted.
4. **Transcribing and analyzing data:** The interviews are held, after which they are transcribed in full. The interviews are then coded on the basis of the 'variable model' (figure 8, page 26). Kwalitan is the tool used for coding. The results are then interpreted and discussed.

3.3 Research methodology

Epistemological research is warranted due to the lack of public sector EAM literature and recurrent themes on the basis of stakeholder perspective or engagement. The goal of this project's empirical research is to:

1. Identify existing processes on the basis of documentation;
2. To discover how the organization strategically governs the management of its EA in the run up to a change-project, what stakeholders are represented and how the impact of law & legislation are approached;
3. To discover how the operational side of the organization is involved in managing the EA, what stakeholders are represented and how the impact of law & legislation are practically managed.

The first phase, archive research, creates an overview of the excise EA domain (its organizational units and business processes). Projects that fall within this domain are identified. Relevant strategic objectives are listed and ranked, to be applied as interview themes during data collection. The

stakeholder analysis determines what roles per organizational unit are involved in the architecture management processes.

3.4 Data collection and analysis

The set-up of the empirical research has a multi-phase research design³⁵. Archive studies is followed by a round of interviews. The research design is complementary, to allow elaboration, clarification and linking of results and ideas that have been identified in prior stages. The interviews are to be semi-structured, so each participant can provide context-oriented input. The interviews are held in Dutch. Transcription is in Dutch.

Step	Explication
Reduction	Transcribe
Evaluation	Evaluation of discourse and words
Process data	Assign values and codes to text
Analyze data	Identify patterns and themes
Draw conclusion	Draw conclusions based on the corresponding phase-research question(s)

Table 14: The itinerary for the analysis of interview results

The research consists of an embedded case-study where one EA domain is thoroughly analyzed by interrelating several vantage points in different organizational realities. The interpretative character allows embedding of data and information within the theoretical framework.

Each interview has three strands. Firstly, the interviewees are questioned concerning their role in the strategic management. Secondly, they are questioned concerning their role in operational management stages. Additionally, they are questioned concerning their knowledge of the strategic objectives relevant to the excise domain.

After transcription, the interviews are coded in the application Kwalitan. Variables and (possible) indicators are pre-identified and modelled on the results of literature research. Common themes are also identified ad-hoc, to allow unexpected results to be inferred. By grouping all stakeholder together, but also creating three classes on the basis of stakeholder roles, perspectives can be compared. Next to pre-identified codes, thematic codes are applied on the basis of the strategic objectives discussed with each interviewee. For more on variables, indicators and codes, see chapter 4.

3.5 Validity and reliability

Archive studies will be used as context, because their epistemological value cannot be verified within this research's timeframe. An advantage here is the inclusion of ArchiMate in the theoretical framework and the consistent use of ArchiMate in the target organization. This increases reliability and eases the process of identifying organizational units, processes, roles and systems.

The structure of research is incremental. The research model is followed by a model that displays the concepts from the literature research. This forms the basis for the stakeholder analysis, so that the development of these models and can be seen as an extension of one another. This trajectory is traceable and translatable. The interviews take the stakeholder and research model as a starting point, leaving room for both general aspects of EAM, their role within that framework as well as their personal

³⁵ M. Saunders, P. Lewis, A. Thornhill. (2016). *Research Method for Business Students*. Pearson.

experiences. The empirical research phase and the data collection therein therefore bears a direct relation to the structure of research.

Validity and reliability is increased by maintaining a close connection to the theoretical framework, both through variables and the interview set up. The variables are described and visualized in figure 8 below (page 26). The variables can be interpreted generally (all stakeholders) as well as applied through a single stakeholder perspective. The interviews are structured in such a way that questions are tailored to the stakeholders role, while ensuring its fits within the theoretical framework and research model to consistently answer the main research question.

Concerning reliability and the quality of research, the interview structure was subject to peer review of an excise duties process subject matter expert that was not involved as an interviewee for data collection. All relevant remarks and suggestions were included in the final interview set-up. For each interview recordings have been made that state the interviewees name, role and permission to record. All interviews have been transcribed in full.

As the researcher is an employee of Dutch Customs (IBS) and is involved in the excise processes, bias has to be considered and avoided. The length of involvement and the role as process designer are an extension of this project. There is no conflict of interest. Before each interview it will be explicated that the researcher works on one of four excise projects and is involved with system-process design.

4. The EA domain and stakeholders

In this section, the research model based on the literature research is applied in the stakeholder analysis. The concept 'enterprise architecture' from the literature research is used to demarcate the scope of the domain. Within that domain, organizational units and roles therein are identified and classified, to ensure law & legislation, operational processes and IT are represented by the selected stakeholders.

4.1 Determining the EA domain

In order to answer the other empirical questions, on the basis of archive studies the enterprise architecture domain must be bordered. This phase takes place prior to the interviews, in order to ensure proper identification, analysis, classification and selection of stakeholders. This, in turn, is required to reach a satisfactory and reliable pool of candidates, without which comparatively analyzing perspectives on EAM, engagement and strategic objectives is impossible.

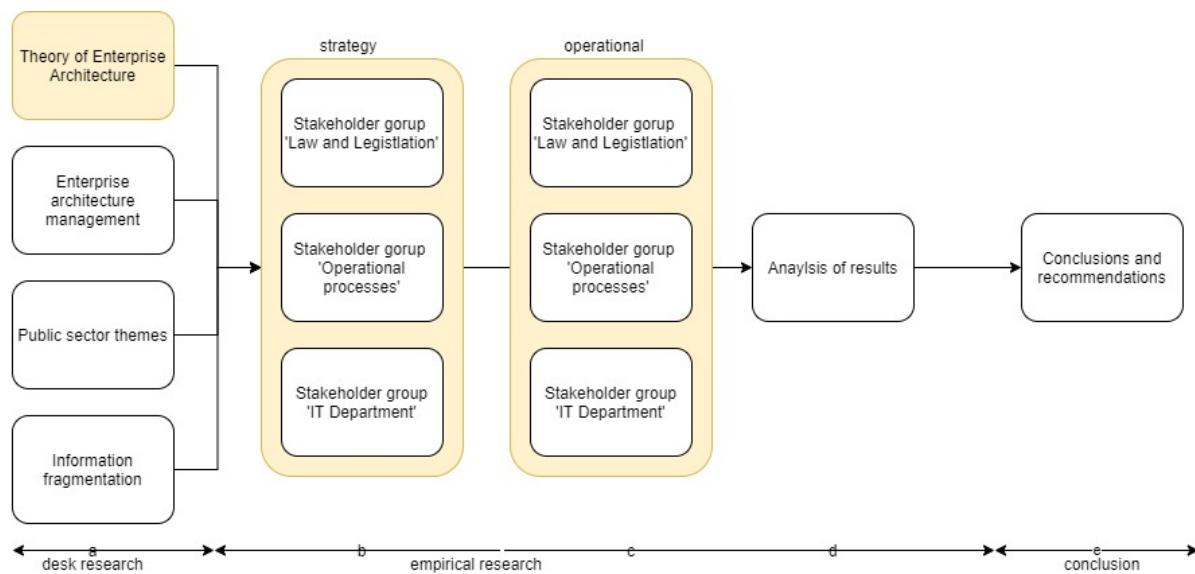


Figure 4: Operationalizing the research model, step 1

In figure 4 above, the concepts from the literature research were illustrated in relation to the stakeholders. The first incremental step in 'determining the EA' is to identify what organizational units in the case study represent the stakeholder groups for 'law & legislation', 'operational processes' and 'IT department'.

In order to identify stakeholders, the business processes must be identified that fall within the EA domain. This was done through archive studies. The Business Process architecture (appendix A), organizational model and IT architecture identify what belongs to the enterprise architecture domain of excise.

Concerning the business process architecture, three business processes were identified:

1. Excise Control and Movement System (EMCS);
2. Excise Duties Declarations;
3. Excise Refunds

On the basis of the IT architecture, four strategic projects were identified. For each project a document exists called an epic. The following four are in scope:

1. 'Digitizing Excise Duties Declarations';
2. 'Handling irregularities';
3. 'Digitizing Financial Customer Requests'
4. 'Rebuilding Excise Monitoring and Control System'.

These four epics, like any strategic project within Customs, are assigned a relative expected contribution to strategic objectives. Out of eight strategic objectives, the change projects in the excise domain contribute to five. These are listed, weighed and described in table 15 below. For a full list of strategic objectives and strategic objectives per change project, see appendix B.

Rank	Strategic objective	Weight (0-20)	Description
1	Technical quality	19	Resolving technical debt by replacing outdated technology and information systems.
2	Orderly financial management	15	Concerns: promoting remittances; decreasing risks of uncollectable bills; working with real-time data.
3	Customs Digital	13	Improved interaction and communication with customers.
4	Law & legislation	7	Implement European regulations or directives in national law; connecting excise movements to declaration processes;
5	Collaboration and direction	6	Directing and collaborating with other government agencies through sharing information in, over and between processes; uniform data.

Table 15: The strategic objectives relevant to the enterprise domain of excise processes.

The strategic objectives are ranked from top to bottom by assigned weight. In each strategic project, an epic can score a maximum of 5 points on each strategic objective. There are four epics in total, hence the total maximum number is 20. For each strategic project of Dutch Customs, the expected contribution or impact of that project is weighted relative to the current situation. For excise duties the following can thus far be said:

- Modernization through 'technical quality' is perceived as most important;
- Orderly financial management comes in second. Although its main concern is increasing remittances, it bears a close relation to law & legislation, because of met legal financial obligations;
- Customs digital: Dutch Customs strives for 99% digital interaction with citizens of companies. It is therefore a strategic objective that bears a close relation to 'technical quality', because it requires modernization;
- Law & legislation: The primary concern of Dutch Customs is to enforce European and National law;
- Collaboration and direction: By collaboration in practice and through sharing data, government agencies want to act in unison to decrease compliances procedures.

The epics and strategic objectives are important. Firstly, the epics are the foundation of strategic projects, and hence add to the depth of comparative analysis of stakeholder engagement. Secondly, the strategic objectives are applied to each strategic project and therefore allow a comparison between the interpretation of strategic objectives on a stakeholder basis. And last but not least, the accumulated weight of each objective within the excise domain are a sound indication of what the organization has already identified as strategically most important.

4.2 Stakeholders of the EA domain

The interpretation of EA stakeholders here is defined as ‘those relevant in managing the EA’. Two models were used to classify stakeholders. On the right in figure 5, the model by Clarkson³⁶ is shown. It is used for the initial and rudimentary classification of a broad group of stakeholders. Because the internal domain EA is the focus of research, only those stakeholders that are ‘organization internal’ are viable for further selection.

Three main organizational units were identified as vital:

5. Customs National Office, subdivided in:
 - a. Policy enforcement unit;
 - b. Strategy;
6. Regional office(s);
7. IBS Customs;

For the purpose of analyzing the stakeholders that are organizational internal to the EA of Dutch Customs, the salience model³⁷ (figure 6 below) is applied, wherein only those stakeholders active in core groups 5, 6 or 7 are eligible for selection of interviews.

All identified stakeholders are assigned to qualitative classes on the basis of a combining these two models in line with the research problem statement and goal. The qualitative classes and attributes with corresponding definitions can be found in Appendix C.

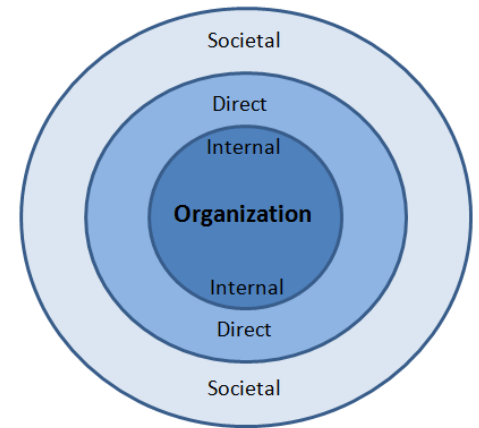


Figure 5: Clarkson et al: Stakeholder organization

All stakeholder are assigned to organization ‘internal’, ‘direct’ or ‘societal’, depending on their expected involvement in directly managing the enterprise architecture. Only stakeholders classified as ‘internal’ are viable for selection. See attachment X for a full list.

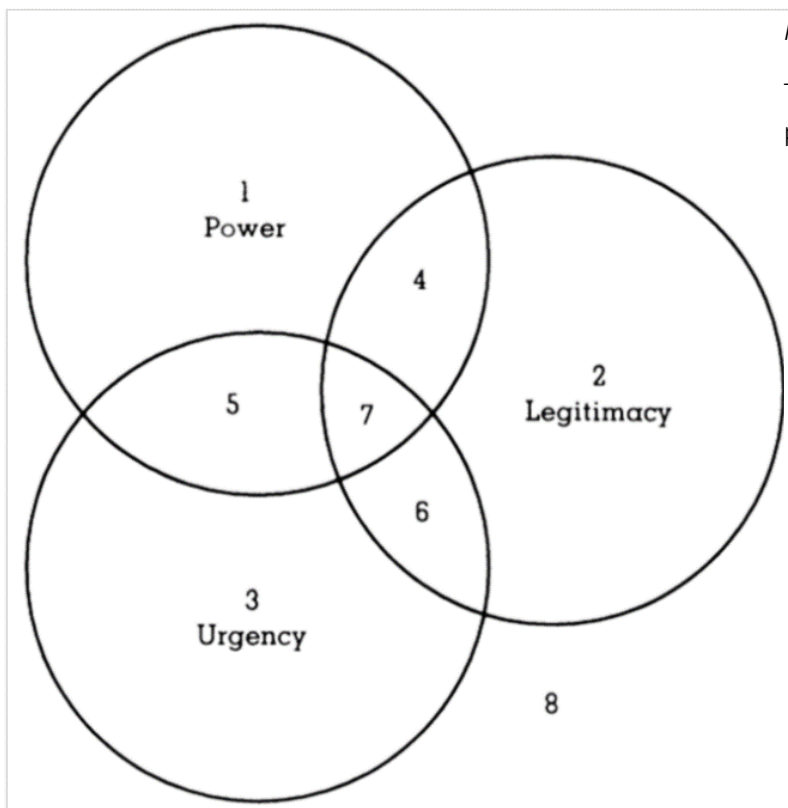


Figure 6: Mitchell et al Stakeholder classification

The interpretation per class as applied in this research paper:

1. Stakeholder can impact project, low (internal) engagement;
2. Legitimate stakeholders, little to no (internal) engagement;
3. Vocal and (indirect) influential stakeholders, low (internal) engagement;
4. Stakeholder with power and legitimacy, but low (internal) engagement;
5. High power, high urgency, but no legitimacy, but internal engagement might be required;
6. High urgency and legitimacy and engagement might be required;
7. Core stakeholders to be managed and engaged with;
8. No stakeholder.

³⁶ Stakeholder classification (Clarkson, 1995; Madsen & Ulhoi, 2001; Driscoll and Starik, 2004)

³⁷ Mitchell et al, (1997). *Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts.* Academy of Management Review. (Vol 22. No. 4). P853-886

Stakeholders selected to be interviewed should thus be assigned category 5, 6 or 7 to be eligible to be interviewed. The classification of stakeholders as such has been verified by an excise duties subject matter expert. The results of the selected roles are listed in table 16 below.

Stakeholder category	Organizational unit	Role
Operational processes	Regional office	Business owner
Operational processes	Regional office	Department coordinator excise (a.k.a. Subject Matter Experts)
Strategy	Customs National Office (Strategy)	Enterprise architect
Strategy	Customs National Office (Strategy)	Chain director
IT Department	IBS Customs	IT Architect
IT Department	IBS Customs	Business analyst
Law & legislation	Policy Enforcement Unit	Chairman coordination group for excise
Law & legislation	Policy Enforcement Unit	Secretary coordination group for excise

Table 16: Stakeholders roles applicable for interview selection

Stakeholders are a combination of the refinement through two models, having been assigned the value 'internal' for organization and '5, 6 or 7' for stakeholder class.

The columns from left to right:

1. Stakeholder category: The values that correspond to the stakeholders in the operational research model in the empirical research stage;
2. Organizational unit: On the basis of archive studies and stakeholder analysis, the set-up of the operational research model is applied in the empirical stage to the case study organization;
3. Role: The roles relevant in the EAM for each stakeholder group in the case study organization.

Because the Business owner is the replacement CEO of one of the Regional Offices, an additional interview was held with an department coordinator to ensure a minimum perspective-width from the operational process perspective. As for validating the interview applicability and quality, a candidate from group 5 was selected that was not selected for the interviews for data collection.

4.3 Variables and indicators

The literature research identified several key concepts on the basis of the last three research questions. These concepts are illustrated in figure 7 below.

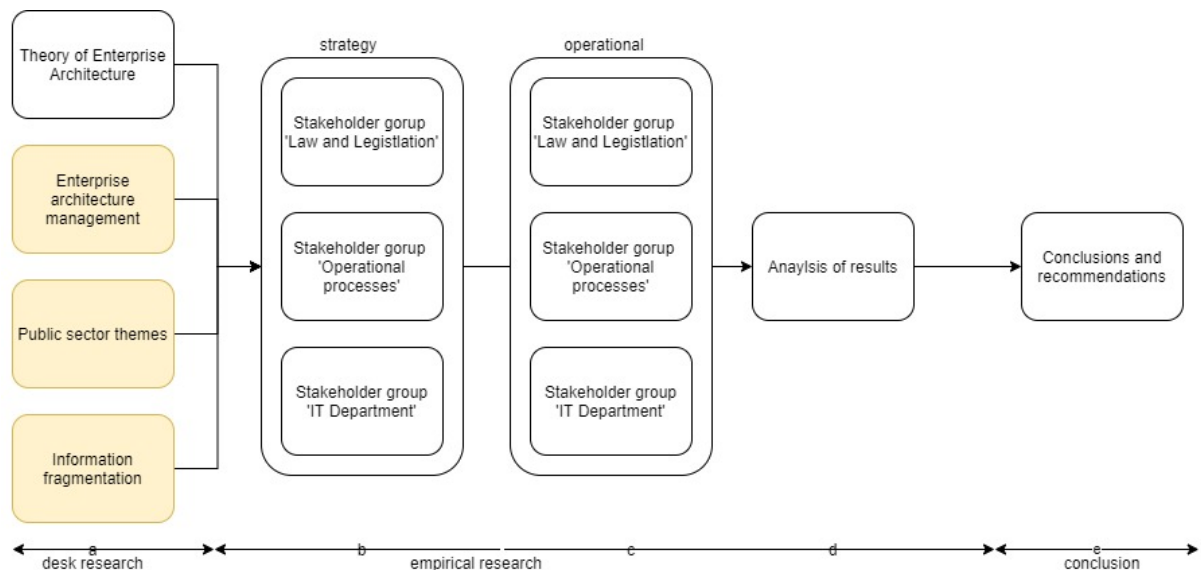


Figure 7: Operationalizing research model, step 2

Enterprise architecture management, public sector themes and information fragmentation have identified several concepts, among which are 'EA as a process', 'EA as a product', 'public sector' and 'information fragmentation'.

The concepts identified through literature research are applied with variables and extended with indicators to serve as a basis for coding the interviews. Four variables with expected indicators are identified. These are shown and described in relation to one another in figure 8 below. The figure description follows in table 17.

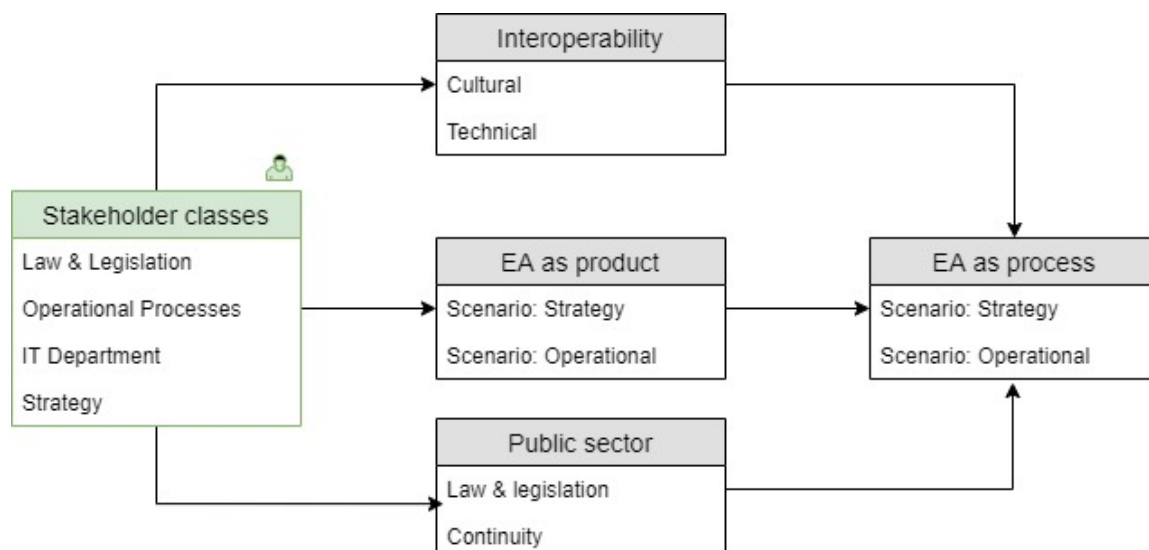


Figure 8: Variables and expected indicators

Stakeholder classes:

The research aim is to include stakeholder engagement and vantage point in EAM. The variable model underlines this: Each variable is assessed collectively, but must also allow interpretation per stakeholder class. The latter allows cross-referencing the perception and interpretation of the variables depending on organizational roles. Although technically the stakeholder class is not a variable, the assignment of the interviewees do impact on the results of subsequent variables and must therefore be included. The three groups correspond to the 'IT Department', 'Operational Processes' 'Law & Legislation and 'Strategy'. What roles belong to each group is determined in the stakeholder analysis below.

Interoperability

An independent variable. Used to assess the role of extent of information fragmentation. Founded on the concept of 'interoperability'. Indicators 'cultural' and 'technical' . Expected to impact 'EA as process' through determining the organization's capacity to self-manage its diverging interests (cultural) and the extent to which information is available in-, over and between the EA's processes (technical).

EA as product

An independent variable. Used to assess what the strategic and operational input is. Impacts 'EA as a process' through strategy documents and directions (epics) and operational requirements on the basis of the current situation (features).

Public Sector

An independent variable. Used to assess if themes are recurrent and characteristic of public sector EAM. Expected indicators are continuity and law & legislation. Expected to impact 'EA as a process' as driving architectural choices.

EA as process

A dependent variable. Expected indicators are initiatives, governance and processes. How these are organized is an outcome of the requirements or results of the other variables.

On the basis of literature research, the identified variables and indicators, a set of theoretical questions is posed. These are listed in table 19. From the theoretical questions, interview questions are derived. These are included in the interview template. The interview template is part of 'collecting empirical data' and it can be found in the appendix D.

Table 17: Description of variables and indicators

4.4 Collecting empirical data

The main research question is partially concerned how EAM is applied to reach strategic objectives. Literature research has indicated realizing strategy is central to EAM. However, it also become evident that if strategy is not disseminated throughout the organization, this becomes problematic. Therefore the interviews are structured around the variables, as displayed above. Furthermore, as figure 8 also shows, there are two scenarios for 'EA as a product' and 'EA as a process': Strategic and operational. The interviews therefore follow two strands, representing 1) strategic stakeholder perspective and (2) the operational perspective. A synthesis between the concept of literature research and the variables illustrates this in figure 9.

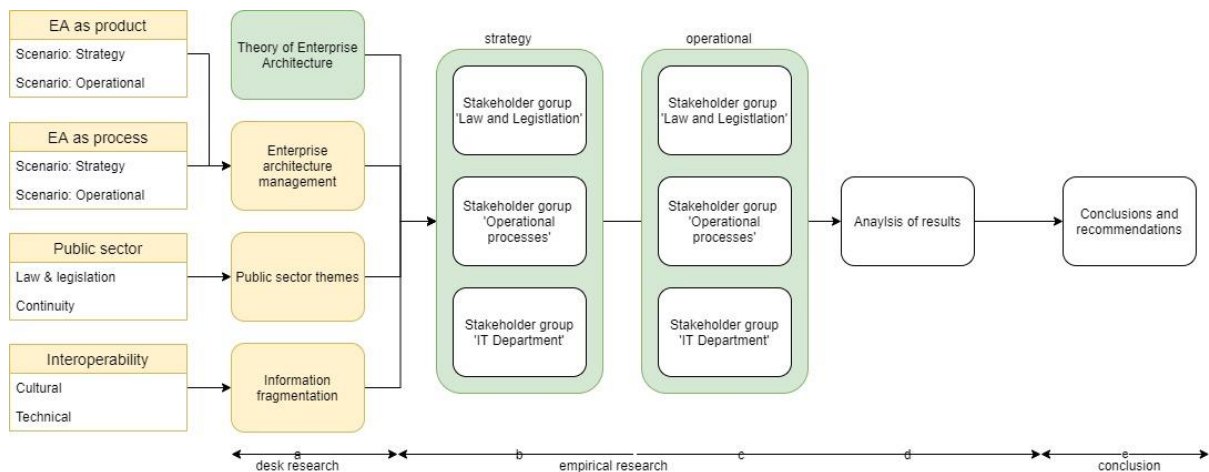


Figure 9: Full operational research model

On the left, the variables as introduced in figure 7. These correspond to concepts from the literature research, indicated by the yellow blocks. The blocks in green represent the relation of the EA domain to the stakeholders, as described in the stakeholder analysis above.

The link between the scenarios 'strategic and operational' should now be evident in relation to the approach in classifying stakeholders.

Table 18: Description of full operational research model

This leaves room to compare stakeholder perspective on the basis of stakeholder-class assignment. Effectively, this translates the interview questions in parts concerning interviewee roles in the strategic EAM, operational EAM and, additionally, concerning their knowledge of the strategic objectives relevant to the excise domain, by applying these as interview themes. The strategic objectives are an additional way of assessing the dissemination of strategy throughout the organization.

Differences among interpretation can shed further light on stakeholder perception of control over and engagement with managing the organization. The epics' purpose was to lay-bare the direct relation between stakeholder involvement in phases of the EAM processes.

For the interview introduction, a full list of questions and context information see the appendix D. In table 19 below are some examples of interview questions.

The columns from read from left to right represent the following:

- Interview question number;
- Variable: the variable the interview question is aimed to shed light on;
- The interview question;

An example: *Question 15* 'are you involved in initiating change?' is assigned to variable '*EA as a process*'. Depending on whether the variable indicator 'strategic' or 'operational' is applied in coding the qualitative data, conclusions can be drawn in relation to the empirical research question. Such conclusions can subsequently be enhanced by comparatively analyzing the different answers on a stakeholder by stakeholder basis.

Interview question #	Variable	Question
----------------------	----------	----------

1	Interoperability	What cultural aspects are known to you that hinder the organization in managing its EA? Think of practical examples that go wrong.
2	Interoperability	What are technical aspects that hinder the effective functioning of operational processes? Think of information that is not readily available or accessible.
3	Interoperability	Are there architectural standards for information exchange or technical solutions?
4	EA as a product	Is the EA documented as a product? Is this unambiguously linked to a target state?
5	EA as a product	Do strategic products sufficiently take your requirements and or interests into account?
6	EA as a product	What, according to you, are the primary concerns when it comes to the organization as it is now, in light of its operational processes?
7	Public sector	How does the organization ensure it is compliant with law & legislation?
8	Public sector	What role does continuity play in managing the enterprise?
9	Public sector	What recurrent themes is the organization subject to?
10	EA as a process	Are you involved in initiating change? How does strategic change relate to operational change?
11	EA as a process	After a strategic initiative has taken off, what is your role, input and influence in its direction?
12	EA as a process	What is your role and influence on operational requirements that belong to a strategic project?
13	EA as a process	Is there a governance structure for strategic change? What is the governance structure to include operational requirements?
14	EA as a process	How is operational change reflected in the enterprise's governance structure?
15	EA as a process	Are you familiar with the strategic goal 'x'? If so, you can explain to me what it means in general? If so, can you explain to me what role it plays in the excise domain?

Table 19: Examples of interview questions per variable

5. Results and discussion

In this chapter the manner of data collection, coding and analysis is described.

Nine interviews were held for to gather data for research. The stakeholder analysis identified at least two candidate roles for each of the three vantage points that represent the strategic and operational character of EAM and the driving architectural role of law & legislation.

Interviews were in-depth and semi-structured. Interviews consisted of three strands: 1) Introduction and context; 2) Generic interview questions concerning involvement in EAM; 3) knowledge and understanding of strategic objectives to cross-reference the dissemination of strategy throughout the organization.

Interviews were coded according to the 'variable-indicator' figure explained in chapter 3. Each variable is used as a theme. Each indicator is applied as a code within that theme. The results are analyzed by grouping all stakeholders results together and by comparatively analyzing results on a stakeholder-group basis.

5.1 Additional information on interviews

The time spent on each interview differed substantially. The interview length varied between approximately 40 to 120 minutes.

All interviewees were presented a brief introduction into the theme of research. All interviews were held in a three week time-span. This ensured translatability of perspectives: If the time span had been much longer, the ongoing projects could have changed the perception of the topic. All interviews are fully transcribed. Due to privacy concerns, they are not openly accessible. However, coded fragments and concurrences of code used in the data analysis are included in the appendices. All references to natural persons have been removed.

5.2 Analysis and coding

The qualitative analysis of the interviews was done using Kwalitan as described in chapter 4. Software version 764.10s.19.2017 was used. All interviews are imported into Kwalitan in their entirety.

Due to the maximum of subprojects in a project in Kwalitan, the total results could only be compared to one stakeholder group. An export was thus made for each stakeholder group compared to the total pool of interviewees. The results of code were aggregated afterwards and used in this chapter.

The themes and codes are based on the variables and corresponding indicators. A list of code results can be found in Appendix F. Concerning personal involvement of the interviewee, the generic questions create a baseline that is easily used in a comparative analysis. Concerning the differentiation between strategic and operational EAM, the strategic objectives are maintained as interview themes applied to the excise domain.

5.3 Examples of coding

As stated previously, the variable and indicator model is the basis for coding. The stakeholder classes (left) can hence be applied collectively or singular.

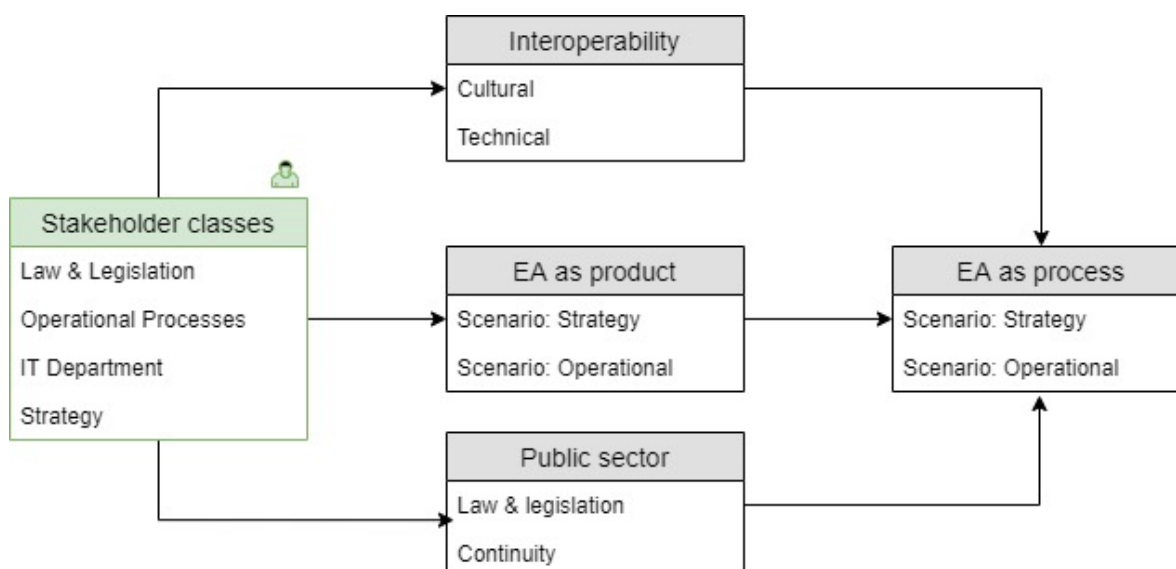


Figure 10: The variables and their expected indicators

Examples of applying these codes and variables are shown in tables 20 to 23. The tables show the codes in relation to stakeholder class, variables and indicators. The large boxes contain the code-fragment from the interview. The texts of the code-fragment is displayed in Dutch, the language in which the interviews were held.

Stakeholder class	Variable	Indicator
Strategy	EA as a process	Scenario: Strategic
<p><i>Dus de eerste toets is van een vraag omzetten naar een epic value statement. Even toetsen bij X: Gaan we het oppakken of niet? Als hij het heel belangrijk vindt dan kan het zijn dat het in de regiegroep besproken moet worden, want ik vind het voor alle business owners belangrijk of wat dan ook. Maar normaal gebeurt dat niet. Dan wordt de epic uitgewerkt. Dat kan door het keten team, of portfolio team, dat ligt een beetje aan de beschikbaarheid van mensen. En dat wordt ook afgestemd met BO of andere stakeholders. En als het een V0.9 is dan gaat het naar de regiegroep en dan gaan we vaststellen tot een 1.0.</i></p>		

Table 20: Example of variable EA as a process for the strategic scenario

Stakeholder class	Variable	Indicator
Operational	EA as process	Scenario: Operational
<p><i>Dat is volgens mij de eerste die echt besproken is. Daar zijn best wel behoorlijk wat opmerkingen over geweest. Die zijn toen eigenlijk helemaal niet verwerkt. Tijden later kwam dit weer boven water. Dus die is heel lang blijven sukkelen. Die aangifte epic. Die andere die hebben we nog niet echt – de laatste tijd hebben we daar helemaal niets meer mee, met die epics. Eerst deden ze in die kerngroep – toen hadden we aparte groepjes en kwamen we tussentijds bij elkaar om die epics te beoordelen. Aan het begin liep dat niet helemaal goed. Dan hadden we een aantal opmerkingen, maar vervolgens werd dat weer niet aangepast. Volgende keer was dat weer helemaal kwijt en konden we weer opnieuw beginnen.</i></p>		

Table 21: Example of variable EA as a process for the operational scenario

Stakeholder class	Variable	Indicator
Operational	Public sector	Law & Legislation
<p><i>Op dit moment, mijn ervaring met automatisering, is dat wetgeving niet het fundament is, maar dit wel zou moeten zijn. Het is niet het fundament. Er staat wel in een epic beschreven dat geldende wet en regelgeving van belang is, maar er is niemand die de wet even leest om vast te stellen aan welke eisen iets moet voldoen.</i></p>		

Table 22: Example of variable Public Sector for law & legislation

Stakeholder class	Variable	Indicator
Operational	Interoperability	Technical
Alleen het overzicht is in de praktijk niet accuraat. Er staan dingen in die niet juist zijn. In de nieuwe versie van DTA wil ik dat de bestuurlijke informatie, het productie overzicht krijg met een druk op de knop. Als ik nu de BI moet doen, ben ik 2 uur bezig. Het is niets anders dan importeren in EXECL van resultaten uit de bladertool, waar ik vervolgens filters op los moet laten om te achterhalen wat onze productie is geweest. En op basis daarvan kan een selectie gemaakt worden voor controles.		

Table 23: Example of variable Interoperability for the technical indicator

5.4 Qualitative results and quantification of results

Below are the results on of the empirical research questions by paragraph.

5.4.1 How are driving public sector architectural demands incorporated in enterprise architecture management processes?

Below are the results that answer the first empirical research question: 'How are driving public sector architectural demands incorporated in EAM processes? The first part deals with law & legislation, it ends with continuity.

The coding results of law & legislation are diverse. The number of concurrences underlines the issue both as theme and strategic objective. This is shown in table 24.

	EA as process strategy	EA as process: operational	Law & legislation
EA as process strategy	76	8	8
EA as process: operational	8	69	8
Law & legislation	8	8	69
The concurrences of law & legislation follows suit with EA as a process. Noteworthy is its close association with managing as an EA process. There are no other pairs of code that occur more frequently, corroborating the expectation that law & legislation is a driving architectural factor. The limitation of this data is that it does not discriminate how law & legislation is applied and perceived as a driving architectural factor.			

Table 24: The codes with the most frequent concurrences and the number of concurrences between these codes

The variable law & legislation has two indicators: law & legislation and policy and its enforcement. The latter is derived from the former. This distinction fine tunes the result shown in table 24 above.

Code	Sub-code	# interviews	#concurrences
Law & legislation			
	Law & legislation	9	35
	Policy and enforcement	6	33
The number of concurrences of the indicators law & legislation and policy and its enforcement reflect respectively the strategic and the operational perspective. On the basis of the data above, both seem equally important. No specific conclusions can be drawn from this, but the number of			

interviews policy and its enforcement is a reason to comparatively analyze the perception of the most contrasting stakeholders in this area.

Table 25: The variable law & legislation split into its indicators

The most contrasting stakeholders are Customs National Office: Law & legislation and the Regional Offices. These organizational units are the on the other end of the spectrum from one another, as the former is responsible for the legislative process and the latter for enforcing it. The graphs below show this. The left graph shows the distribution of concurrences of table 25. The graphs below shows the distribution in percentage points of concurrences concerning law & legislation and policy and enforcement.

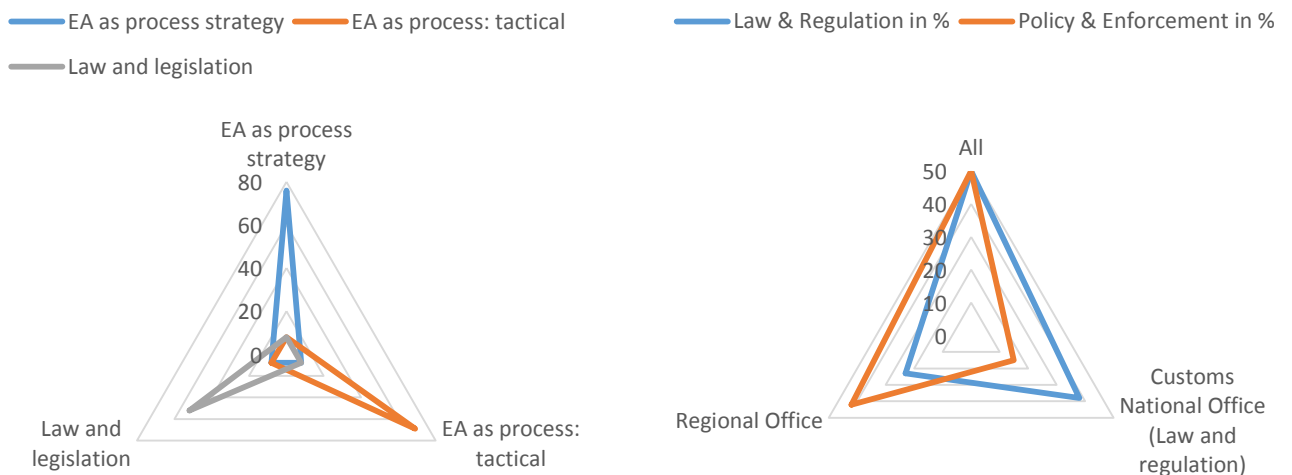


Figure 12: EA as a process: Strategic and operational

The spread of EA as process from a strategic and operational perspective, in relation to law and legislation.

Figure 11: Splitting law & legislation

When the variable 'law & legislation' is split into its indicators 'law and legislation (strategic)' and 'policy and enforcement', the former leans on the National Office, the latter on the Regional Offices.

The number of concurrences of law & legislation is evenly distributed in the left graph, regardless of looking at EAM from an operational or strategic perspective. If the spread of law & legislation is split into its variables and graphed from a stakeholder perspective, however, an almost identical relative distributed weight is shown. This seems to imply a correlation between strategic EAM and law & legislation and operational EAM and policy and its enforcement. Tabling these results shows the same in terms of code prevalence and concurrence from a strategic and operational perspective (table 26 and 27 below). This is corroborated by statements of interviewees. Stakeholders from Customs National Office maintain a 'traffic light system': Either a project passes legal checks, or it does not. This contrasts starkly with stakeholder statements from the Regional Offices that speak of 'insufficient architectural checks concerning the legal foundation of new systems in their relation with operational processes'.

In answering ‘how are driving public sector architectural demands incorporated in EA management processes, two answers are given concerning law & legislation: The strategic answer in table 26 and the operational answer in table 27. Concerning continuity, the results of the observations are in table 28.

<i>How is law & legislation integrated in strategic governance structures?</i>		
Combined concurrences	# interviews	Code combination
8	9	‘EA as process strategic’ and ‘law and legislation
Law & legislation is an expected public sector architectural factor. Concerning its integration in the EAM of the public sector case study organization, EAM does not deal with law & legislation as a central strategic tenet. Rather, law & legislation is a ‘go or no-go principle’. A legal-conformance check by legal experts is the basis for initiating any project with a (strategic) impact.		

Table 26: The integration of Laws and legislation in relation to strategic governance structures

<i>How is law and legislation integrated in operational governance structures?</i>		
Combined concurrences	# interviews	Code combination
8	6	‘EA as process operational and ‘law & legislation’
4	6	‘EA as a process operational’ and ‘policy and its enforcement’
Regular meetings are held with participants of the Regional Offices, each of which sends a representative in the role of ‘Department Coordinator’. Collectively, this group of officials is responsible for aligning law & legislation to policy and its enforcement. However, this primarily concerns business questions unrelated to managing the enterprise. To align law, business and IT, ad-hoc and informal structures have been created that that are not strategically managed and do aim to define operational requirements. Concerning the integration of law & legislation in operational structures, a lack of the dissemination of strategy throughout the organization results in a diffused meaning of ‘laws and legislation’ that is very much dependent on the stakeholder’s role. Paraphrasing the stakeholder group of the Regional Offices, there is a clear ‘lack of architectural verification concerning the design of information systems and the manner in which these realize legal principles’.		

Table 27: The integration of law & legislation in relation to operational governance structures

Another driving public sector theme is continuity. Two sub-codes have post-hoc been grouped under the variable’s indicator ‘continuity’, namely ‘technocracy’ and ‘technical quality’. The former being an indication of political character, the latter being a strategic objective. The results are shown in the table 28 below.

Code	Sub-code	# interviews	#concurrences
Public sector			
	Technocracy	5	15
	Technical quality	8	68
The concurrence of technical quality with EA as a strategic process ranks in the top six. Although the number of concurrences of technocratic and technical quality is only 3 and therefore not significant, the strategic objective ‘technical quality’ is widely interpreted as a driving force for initiating new projects. In case of excise duties, it is unequivocal: All four projects are based on old technological solutions. All four projects were started in unison to replace these technological solutions.			

Table 28: Public Sector theme- continuity refined

5.4.2 What is the role or impact of information fragmentation?

Below are the results that answer the second empirical research question, ‘what role do information fragmentation and public sector themes play in managing the EA?’

Already in the problem statement, information fragmentation was heralded as a problem. The exchange of logistical information is central to this problem, but its context is broader. The concept ‘interoperability’ was introduced as the theoretical foundation to reflect the ability to exchange information. It has a cultural as well as a technical side.

Code	Sub-code	# interviews	#concurrences
Information fragmentation			
	Cultural	6	45
	Technical	8	36
For the organization at large, the fragmentation of information is neither a solely cultural, nor technical problem. At first glance, the only conclusion that can be drawn is that fragmentation is undoubtedly a problem that is widely recognized by all stakeholders.			

Table 29: The indicators for information fragmentation

Diving deeper, the technical side is prevalent in operational processes that rely heavily on IT solutions to facilitate their work. For strategic stakeholders, the cultural forms of information fragmentation seem most problematic. However, as the graph below indicates, the fragmentation of information is unequivocally a primary concern of the operational processes at the regional offices.

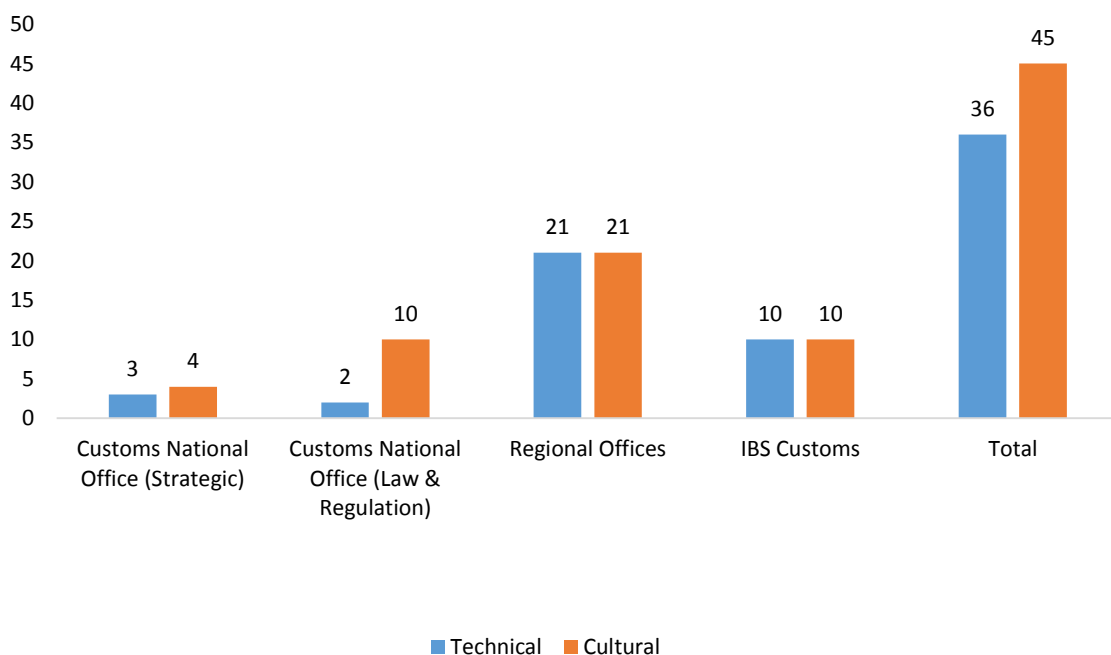


Figure 1: Information fragmentation occurrences per code: Technical vs. Cultural

From a technical and cultural perspective, shown in total and per stakeholder class. The fragmentation of information is of great concern to the stakeholders in the operational processes.

Information Fragmentation from an information system perspective		
Combined concurrences	# interviews	Code combination
4	4	'EA as process' and 'information fragmentation IT'
4	3	'Information fragmentation cultural' and 'information fragmentation IT'
4	4	'Information fragmentation IT and 'technical quality'
The identified problems concerning the technical part is recognized by all stakeholders to be the availability of information between systems, primarily when the information in one system is required in follow up processes supported by other information systems. However, it is clear by sheer number that stakeholders in the operational processes are directly hindered by the inability to access or retrieve information. Direct relations exist between accessibility and usability of information and external fraudulent activities. Furthermore, the data seems to suggest a relation between 'cultural fragmentation' and 'IT fragmentation'.		

Table 30: Information fragmentation and information systems

Information Fragmentation from a cultural perspective		
Combined concurrences	# interviews	Code combination
5	4	'EA as process strategic' and 'information fragmentation cultural'
4	4	'Information fragmentation cultural' and 'technical quality'
4	3	'EA as process operational' and 'information fragmentation cultural'
4	4	'Law & legislation' and information fragmentation cultural'
The ability to exchange information is central in managing an EA. Where the operational processes suffer from a lack of information exchange through information systems, the same is implied by the frequency whereby both the EA as a process is impeded in the strategic <i>and</i> operational functioning. Although the data above does not point directly to the distinction between law & legislation and policy and its enforcement, due to the lack of dissemination of strategy throughout the organization, from a stakeholder perspective it would be a likely candidate to anticipate on in the EAM governance structure.		

Table 31: Information fragmentation by cultural causes

Another interesting feature of information fragmentation is that organizational challenges refer to cultural aspects of ownership. Although not identified as an indicator prior the interviews, all stakeholders had a stake in the frequency of this code. Ownership appears thrice in the ten most frequent concurrences of codes. See table 32 below.

Information Fragmentation from an information system perspective		
Combined concurrences	# interviews	Code combination
7	4	'EA as process: strategic' and 'ownership'
7	3	'EA as process: operational' and 'ownership'
7	4	'Law & legislation' and 'ownership'
The (unexpected) frequency of the concurrence of ownership – with 95, by far the highest – unequivocally supports the conclusion that the cultural fragmentation of information plays a pivotal role in EAM.		

Table 32: Ownership and information fragmentation

5.4.3 How are strategic projects and operational demands managed within the enterprise domain?

Below are the results that answer the third empirical research question, how are strategic projects and operational demands managed within the enterprise domain?

Code	Sub-code	# interviews	#concurrences
EA as a process			
	Operational	9	75
	Strategic	9	68

The data is concerning EAM shows an initially inconclusive picture. A split between EA as a process from an operational or strategic perspective seems absent. However, as soon as interview-codes are coupled to stakeholder perspective, the strategic character of EAM shifts primarily to the Customs National Office. For IBS and the Regional Office, EA management leans to an operational character.

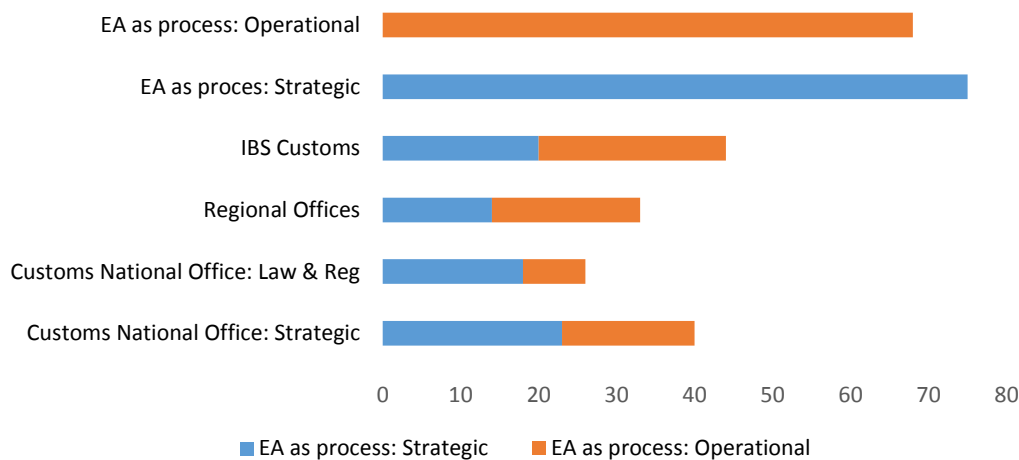


Figure 14: EAM as operational

The character of Enterprise Architecture Management is more an operational than a strategic concern for the IT department (IBS Customs) and the operational processes (Regional Offices).

Table 33: The perception of the nature of EAM: Strategic or operational

Two closely linked variables are EA as process and product. The first through the classification of stakeholders into participants engaged with the case study's enterprise domain. This makes the process that governs explicit. The second in order to classify as an enterprise management (governance) process, it must yield some product. Through archive studies prior to the interviews, epics were identified as the basis for strategic projects, four of which are in the case study's scope. As mentioned, epics consist of features, which resemble the operational character of process requirements. The stakeholders that score particularly high when it comes to strategic EAM (EA as a process) are the two stakeholders for Customs National Office. Although their engagement with projects is present, the lack of positive engagement with features for the stakeholders responsible for law & legislation is noteworthy. Furthermore, the IT department IBS Customs has an immense presence concerning the products that lay the foundations through which the EA is managed.

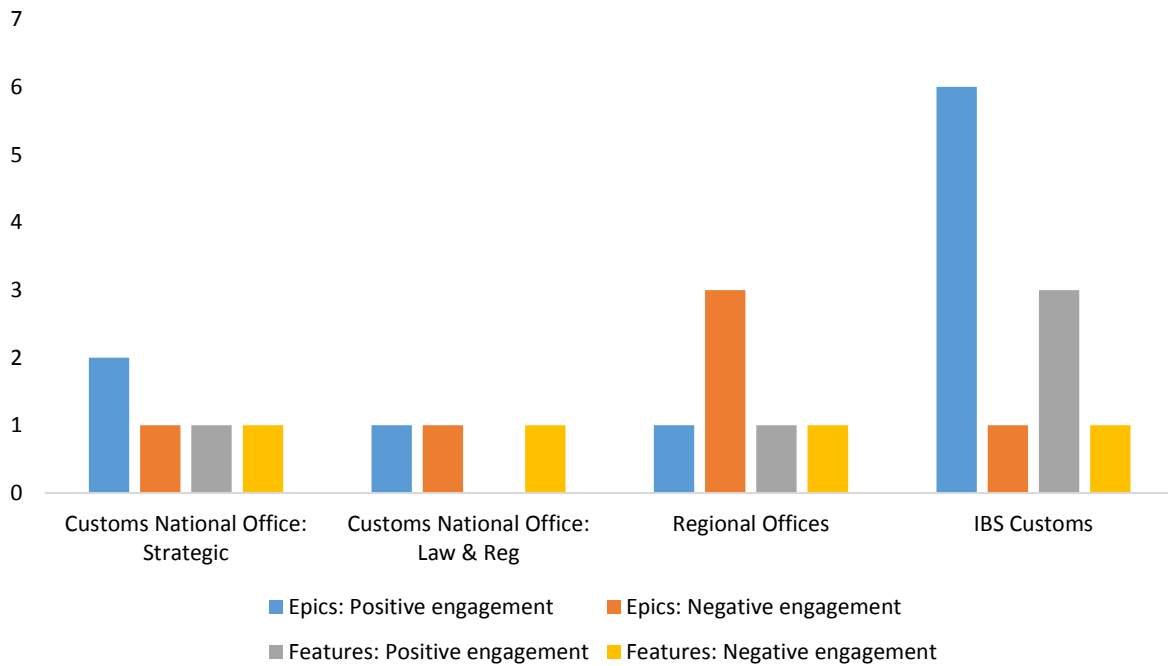


Figure 15: EA as product. The concurrences of codes about the 'engagement with epics and features' grouped by stakeholder

The data corroborates the conclusions drawn above, concerning the technocratic nature of the organization. A noteworthy remark here is that the enterprise as a whole has EAM governance processes in place. Its interpretation by interviewed stakeholders considering project initiation, review and implementation is remarkably consistent, but is completely lacking in reality. The desired situation is that the business defines the epics, a strategic team reviews and prioritizes and the IT department collaborates and aligns with stakeholders of the operational processes. The reality is that the IT department takes the lead in all these stages. Herein lies a risk: As a code, the governance of architecture has a mere nine concurrences, but makes the problem explicit: If a primary challenge is to disseminate strategy throughout the organization, a documented starting point is required, that is validated according to its architecture vision. Two of the architects interviewed – one from the strategic stakeholder, the other from the IT department – underlined the lack of a design authority and the informal character of the IT governance structure.

5.4.4 Results concerning the dissemination of a common understanding of strategic objectives

A recurrent theme throughout this research has been 'bringing strategy to execution' and the 'dissemination of strategy throughout the organization'. Because different stakeholders have different perceptions, key-words were collected per strategic objective, per stakeholder class (the Customs National Office taken collectively). Table 34 below shows the results.

Strategic objective	Stakeholder group	Stakeholder perception
Technical quality	Customs' National Office	Replace old systems; improve process functioning; improve data quality;
	Regional Offices	Systems do not meet process requirements; lack of operational reports;

	IBS Customs	Replacement of old systems; using modern technology; improving business-IT alignment;
Orderly financial management	Customs' National Office	Absent.
	Regional Offices	Function separation between levy and collection;
	IBS Customs	Function separation between levy and collection; financial accountability; audit trail;
Customs digital	Customs' National Office	Absent.
	Regional Offices	Improved IT solutions;
	IBS Customs	Improved customer interaction; the ability to access a digital workplace for each employee, irrespective of time and place;
Law & legislation	Customs' National Office	All information systems must comply with legal requirements; law & legislation must always be assigned maximum weight;
	Regional Offices	The ability to enforce law and legislation;
	IBS Customs	information systems must support unity in policy and its enforcement; improve quality of data; centralize all data concerning violations of law and legislation;
Collaboration and direction	Customs' National Office	Strategic objective not deemed applicable to excise domain;
	Regional Offices	Concerning the safety of the public, collaboration with government partners with dangerous substances is mentioned as the only example;
	IBS Customs	Strategic objective ranked too high.

Table 34: Stakeholder perception of how and why the epics contributed to the strategic objectives

Although no direct quantification of the data in the table above is possible, it is remarkable how diverse the interpretation and perception of supposedly common defined and targeted strategic objectives is. This is a major risk considering bringing strategy to execution is a primary concern of EAM. Summarizing:

- *Technical quality* has the most shared meaning. Being both a trigger for change and a hindrance for operational processes, this is least surprising;
- *Orderly financial management* is relevant from a process point of view, but the most pronounced stakeholder is IBS – the IT department;

- Customs digital is not well understood at all – it means something different to all stakeholders, or even nothing at all. It is best understood from a technocratic perspective, once again the IT department's perspective;
- *Law & legislation* – seemingly the most obvious candidate for agreement – results in a schism between law and its enforcement;
- *Collaboration and direction* hardly applicable to the excise domain at all.

5.5 Reflection on results

The results indicate the perception of EAM differs depending on the role of the interviewee within the organization. The same can be said of engagement with EAM. Themes identified as public sector themes do indeed show up, but in terms of architectural driving forces, these do not seem to play the conscious role one would expect given their central role. Rather, the technocratic nature of managing the organization seems a result of happenstance, resulting from well-established networks that lack an institutional fiat. This trend is also visible in much of the results that center around the fragmented nature of information, which in terms of culture is primarily a communication concern, and in terms of IT a lack of technological oversight through architectural design authorities.

Concerning the first research question, public sector architectural demands are insufficiently incorporated into the EAM process. Law & legislation is a go or no-go principle with insufficient control over system design and its impact. Continuity is a driving force, but too imbedded in technical IT debt for strategic EAM purposes.

Concerning the second research question, the role of information fragmentation is a great concern. The exchange of information between organizational units is not efficient, because employees lack awareness of who is responsible for what. After IT project initiation, ownership is also a problem due to the large number of teams involved. Technological information fragmentation is perceived as an issue, but is being addressed by the projects. However, from an architectural point of view, the lack of design authorities is perceived as a risk.

Concerning the third research question, strategic projects are largely initiated by the strategic unit of the Customs National Office and the IT department. Continuity drives new projects, even though officially these ought to be initiated to achieve specific strategic objectives. After project initiation management, the IT department takes over strategic management. Operational demands are coordinated by the IT department, with the other remaining engaged party being the regional offices. Coordinating operational demands is an informal process for which no standard process exists.

6. Conclusions and Recommendations

In this chapter the results are used to draw conclusions. This is followed by discussing the reliability and validity and suggestions for further research.

6.1 Main research question

How are enterprise architecture governance processes of a public sector Customs-organization organized, so as to achieve strategic objectives, manage its internal stakeholder interests in the process, while enforcing law and legislation?

From a strategic point of view, the case study organization in a Customs environment has an institutionalized structure to govern its enterprise architecture management processes. A key principle

herein is that the business is in the lead, but this simultaneously points to the problem, because ownership in terms of processes and problems is identified as the greatest problem in relation to both strategic and operational enterprise architecture management.

This is reflected in the results of what drives new EA initiatives: Only two candidates were identified, law & legislation and continuity. Within the case study, only the latter proved of any input. This aspect of continuity mirrors problems frequently encountered in public sector organizations. It is most aptly described as a technocracy, because the organization is driven by what is either desirable or necessary from a technological point of view, not through what innovation, legal principles or the external stakeholders (such as the Dutch state) require.

Law & legislation is another such a problem. Although from a strategic point of view the law unambiguously states what is and what is not legal, stakeholders in operational processes that must enforce the law have an altogether different perception of what this means. This interpretative gap bears an immediate link to information fragmentation. This is a problem that cannot be overestimated and must not be underestimated. In managing an EA, the dissemination of strategy throughout the organization is of great importance, but in similar fashion, what is feasible and enforceable in practice must also find its way into the EAM governance processes. The case study organization has regular meetings to address concerns of law and how it is enforced, but only in answer to practical problems, not in order to manage the strategic direction.

In terms of providing insights into the strategic management of enterprise architectures in public sector organizations – this research corroborates the finding of the literature review, in stating that law & legislation and continuity are driving architectural choices. In light of the practical case study, an improvement would be to implement an architectural authority board. The theoretical counterpart of this recommendation is not to repeat previous technocratic mistakes and turn this into an IT question. Rather, law & legislation and know-how from operational processes must be integrated into such an authority board, in order to lay solid legal *and* technical foundations. Furthermore, in bringing together strategic, legal, operational and IT knowledge, such authority boards must be devolved. A single point of failure through assigning specific roles would be detrimental, because questions concerning disseminating strategy through EAM into an IT and operational reality will differ per organizational domain.

Last but not least, a spillover effect was reached through enabling the strategic objectives as themes in the data collection. The results show that the spread of engagement with EAM is noticeably different depending on stakeholder perspective. Although interviewee interpretation of how the EA changes contribute to strategic objective is not a corroboration of that statement per se, what is symptomatic of stakeholder understanding of strategic objectives seems to result from respective engagement with EAM processes.

6.2 Reliability and validity

The research objective was met. The organization manages its EA in an informal manner that deviates from the institutionalized reality it professes to adhere to. Furthermore, sufficient attention was given to and results were returned concerned recurrent public sector themes, thereby contributing to the body of knowledge about public sector enterprise architecture management.

The research question has been answered. Concerning its reliability, similar though perhaps not the same results will be gained. Gaining the same results in qualitative studies is a philosophical conundrum. However, for the epistemological validity of the conclusions, this research has maintained a path that is

traceable and repeatable as a framework for analysis. The research model, theoretical framework, operational research model and stakeholder analysis follow a consistent incremental path.

Concerning the interviews, stakeholder involvement is partially determined by *when* the interviews were held. The organization may or may not have addressed existing problems, and hence the stakeholder perspective might be different. However, if the same or similar questions are asked in relation to the interviewees role and engagement. The same cannot with high probability be said of the perception of strategic objectives. These were maintained as interview themes, but more precise questions specifically concerned with definitions would be better suited for such a comparative analysis.

An additional remark is that the interviews were held in Dutch and the research is written in English. The interviews were not held in English, because the reliability of the data would come to depend on the language skills of interviewees. Rather, it was chosen to rely on the research model, literature research concepts, variables and codes to ensure a consistent application of theory to practice.

6.3 Guide to further research

This research has focused on an internal enterprise domain of a public sector organization. It has corroborated that public sector organizations meet different challenges than commonly understood in EAM literature. For future research into public sector EAM, this research suggests interlinking several vantage points, among which might be:

1. Law & legislation;
2. Ownership;
3. Information fragmentation;
4. Architectural decision boards;
5. Technocracy.

Concerning (1), law & legislation are as expected a driving force. However, this has not led to an institutional form that verifies that strategic decisions translate well into an operational reality. Point (4) – the architectural decision board – might combine well with law & legislation, because of its architectural legal weight.

Concerning (2), ownership is an unequivocal concern. Clear communication lines can only be established when responsibility and knowledge are combined and colleagues are aware of the situation. This has close ties with (3) information fragmentation. The extent to which information can be exchanged unhindered has, after all, an important cultural aspect to it.

Furthermore, because information fragmentation has been interpreted through the lens of interoperability, future research can build on this by focusing on excise and interoperability. Excise products are defined by the European Union and member states are involved, deepening public sector EA theory; and secondly, excise transport movements between EU member states require systems to interoperate, allowing a different focus on the technical and cultural aspect of interoperability.

Concerning (5), the public sector case study can be marked as a technocracy. One could argue that this would be an argument for EAM, but that begets the question. The question could be why are public sector organizations technocratic in their management of the EA.

7. Reflection

The overhaul of an entire domain made an interesting case study for Enterprise Architecture Management. Due to the involvement of several organizational units, the stakeholder analysis and conceptualization was a vital asset in collecting the data. Each organizational unit and therefore each interview participant has a specific area of expertise and corresponding responsibilities in terms of their own internal processes, but also in regard to processes to be managed on an enterprise level.

From the author's perspective, it was an interesting research project with cooperative interview participants that reflected the interplay of management. The research can easily be extended by taking a deeper look with regards to operational business processes and the manner these are supported by IT solutions. However, the scope of the research did not allow this.

The stakeholder selection was validated in a conversation with an excise subject matter expert, both in terms of the organizational units as well as the participants selected to be interviewed. To this extent, the collected data is a reflection of the organization's form of Enterprise Architecture Management. To conduct research in a domain close to a personal area of expertise was a challenging novelty. To leave the details and look at the same organization through a different lens has resulted in a completely different perspective on the organization and how it acts as an organic whole.

An excellent example of this is the observation that all stakeholders involved considered 'ownership' a key problem. This resulted in a direct piece of advice to create a single point of contact for all excise related IT questions. This communicative aspect lead to a hindered exchange of information and has now been addressed.

Another example is the observation that both architects are consciously aware that there is a lack of design authority. Follow-up action within the organization is expected.

Furthermore, during the research process, a great number of other business challenges were identified outside the scope of this research. For instance during interviews, due to the semi-structured set-up, topics would come up that touch the issue of law & legislation and policy and its enforcement, but that bear no direct relation to EAM. Nevertheless, these could be taken back to the responsible teams to add to their respective backlogs.

Several standalone and combinations of possible directions of study are identified, whereby this research contributes to the EAM body of knowledge about public sector environments.

Appendix A: Business process architecture

The Business Organization Architecture³⁸ – states that the following business processes and work processes are considered to be in the domain of excise duties:

- Excise duties refunds;
- Excise movement and control;
- Excise duties declarations;

Chapter 3 of the Business Process Architecture defines what belongs to the excise domain from a business perspective. The text is in Dutch. It was used as input for stakeholder analysis and scoping.

The IT architecture documentation (modelled in ArchiMate) was used to gain an understanding of the IT landscape, possible information fragmentation and the organizational placement of teams that work on IT excise solutions.

Documents cannot be included due to the confidentiality agreement. They can be shared on request after approval procedures.

However, an excerpt of the relevant information is allowed. The process architecture states the following belongs to the excise domain and processes:

Business process	Work process	Description
Excise duties declaration	Handling excise duties declaration	Straight through transaction processing
	Personal domain	Online environment for declaring duties
	Digital receiving	Logistical chain supporting the digital declaration of duties
	Digital communication	Logistical chain supporting the digital communication to customers
	Handling irregularity	Dealing with breaches of law & legislation
Excise movement and control	Sending excise products	
	Receiving excise products	
	Handling risks	
	Handling irregularity	Dealing with breaches of law & legislation
	Personal domain	Online environment for declaring duties
	Digital receiving	Logistical chain supporting the digital declaration of duties
	Digital communication	Logistical chain supporting the digital communication to customers
Excise duties refunds	Handling refund-request	
	Personal domain	Online environment for declaring duties
	Digital receiving	Logistical chain supporting the digital declaration of duties

³⁸ Van Pelt, H. Platier, E. (2016). Bedrijfsonderdeel Architectuur Douane 2016-2020. *Sectie 2: Processen*. 45.

Business process	Work process	Description
	Digital communication	Logistical chain supporting the digital communication to customers
	Paper receiving	
	Paper communication	

Appendix B: Epic value statements

This appendix contains the epic value statements, which form the basis of the change-projects. They were part of the archive studies, domain-scoping and interview preparation. Due to space limitations and the confidentiality of documentations, more is available on a request basis only. The archives are in Dutch.

Epic value statement of Excise Duties Declarations:

epic BE00007	Digitaliseren Aangiftebehandeling Accijns	
voor	Bedrijven en particuliere klanten	
die	Accijns en verbruiksbelasting moeten afdragen	
is nodig	Dat er een voorziening wordt gerealiseerd die de aangifte en betaling van verschuldigde accijns en verbruiksbelasting ondersteunt	
zodat	<ul style="list-style-type: none"> Aangiften digitaal kunnen worden ingediend en betaald; De aangever maar ook de kantoormedewerker, belast met de behandeling van de aangiften Accijns en Verbruiksbelastingen, volledig geautomatiseerd wordt ondersteund in de berekening van accijns en verbruiksbelastingen; Onnodig overtypen van gegevens wordt voorkomen, doordat informatie eenmalig wordt vastgelegd en meervoudig wordt gebruikt; Risico's, zoals het niet op tijd indienen van een uitgereikte aangifte, het niet tijdig betalen en het ten onrechte verlenen van een teruggaaf op aangifte, worden gedetecteerd en afgedekt De accijnstaken van DOH voor het moment van verplichte uitfasering van het end of life ontwikkelplatform niet meer benodigd zijn; Actuele stuur- en bestuurlijke informatie opgeleverd wordt; De continuïteit van de geautomatiseerde ondersteuning gegarandeerd is en blijft. 	
doelstellingen	●●●●●	Ordelijk Financieel Beheer
	○○○○○	Implementatie DWU / MASP
	●●○○○	Wet- en regelgeving
	●○○○○	Samenwerken en Regie
	●●●●○	Douane Digitaal
	●○○○○	Versterken Toezicht Keten Douane
	○○○○○	Versterken Fundament
	●●●●●	Technische Kwaliteit
verwachte uitkomsten	<ul style="list-style-type: none"> De communicatie tussen aangevers accijns & vb en de douane verloopt voor 99% digitaal eind 2019; Minder handmatige handelingen door de digitale indiening en verwerking; Minder fouten in aangiften; Compliance verhogend; Sluit beter aan op wet en regelgeving. 	
indicatoren	<ul style="list-style-type: none"> aantal AGP aangiften op jaarbasis aantal Dag-aangiften op jaarbasis aantal Week-aangiften op jaarbasis aantal aangiften Vermis Accijnsgoederen op jaarbasis aantal Periodieke aangiften VB op jaarbasis aantal aangiften vrijwillige verbetering Vastgestelde en ontvangen bedragen Accijns & VB 	

epic BE00007	Digitaliseren Aangiftebehandeling Accijns			
risico's	<ul style="list-style-type: none"> Onzekerheid over de tijdige beschikbaarheid van authenticatie middelen voor DTP voor particulieren Planningsrisico door afhankelijkheden tussen de teams binnen de Douane maar ook daarbuiten 			
omvang	L	Het proces Aangiftebehandeling accijns heeft een aantal raakvlakken met andere Douane processen en applicaties. Tevens wordt als onderdeel van deze epic DTP ingericht		
	doorlooptijd	kosten	startdatum	einddatum
MVP	3	600 dagen	PI-13	PI-15
restant	1	200 dagen	PI-16	PI-16

Epic value statement for 'Excise Monitoring and Control System:

Epic BE0024	Herbouw EMCS NL
voor	aangevers, andere lidstaten, douane ambtenaren en beheerders
die	in het kader van Accijns Goederenvervoer werkzaamheden verrichten met betrekking tot (controle op) goederenbewegingen
is nodig	dat de nationale applicatieve ondersteuning opnieuw ontwikkeld wordt;
zodat	<ul style="list-style-type: none"> de technische schuld van de huidige applicatie ingelost wordt; nieuwe ontwikkelstandaarden ingezet kunnen worden; een goed onderhoudbare en eenvoudig aanpasbare applicatie beschikbaar is; het accijnsgoederenvervoer (inclusief beheertaken) adequaat ondersteund wordt; de gewenste beschikbaarheid geboden kan worden,

doelstellingen	●○○○○	Ordelijk Financieel Beheer
	○○○○○	Implementatie DWU / MASP
	●●○○○	Wet- en regelgeving
	●●○○○	Samenwerken en Regie
	●●○○○	Douane Digitaal

	●○○○○	Versterken Toezicht Keten Douane		
	●●○○○	Versterken Fundament		
	●●●●●	Technische Kwaliteit		
verwachte uitkomsten	<ul style="list-style-type: none">Betere ondersteuning van het Accijnsgoederenvervoer;Een moderne, goed onderhoudbare en eenvoudig aanpasbare applicatie;Snellere implementatie van Brusselse releases met beduidend minder inspanning			
indicatoren	<ul style="list-style-type: none">Implementatie Brusselse releases op tijdMinder capaciteit nodig voor aanpassingen			
risico's	<ul style="list-style-type: none">Kennisborging (nu externe ontwikkelaars);			
omvang MVP 1 PI voorbereiding 6 PI's herbouw	kosten € 1.800.000,-	startdatum 1 juli 2018	einddatum november 2019	

Epic value statement for 'Irregularities':

epic BE00009	Afhandelen Onregelmatigheden	
voor	medewerkers van de Douane	
die	op kantoor of mobiel werkzaam zijn in het proces Afhandelen Onregelmatigheden	
is nodig	een geautomatiseerde ondersteuning voor het constateren en afhandelen van onregelmatigheden	
zodat	<ul style="list-style-type: none"> onregelmatigheden uniform worden vastgelegd en afgehandeld er wordt voldaan aan wettelijke vereisten geregistreerde gegevens direct beschikbaar zijn voor nabewerking informatie elektronisch wordt uitgewisseld met derden 	
doelstellingen	●●●○○	Ordelijk Financieel Beheer
	●○○○○	Implementatie DWU / MASP
	●●●○○	Wet- en regelgeving
	●●●○○	Samenwerken en Regie
	●●●○○	Douane Digitaal
	○○○○○	Versterken Toezicht Keten Douane
	○○○○○	Versterken Fundament
	●●●●○	Technische Kwaliteit
verwachte uitkomsten	<ul style="list-style-type: none"> ondersteuning voor het vastleggen en afhandelen van onregelmatigheden die past op de digitale werkruimte van Douane aansluiting van de mobiele oplossing op het kantoorproces oplevering van actuele bestuurlijke informatie uitfasering van de huidige end-of-life oplossingen 	
indicatoren	<ul style="list-style-type: none"> alle onregelmatigheden worden eenduidig en efficiënt afgehandeld in de nieuwe oplossing medewerkers kunnen zowel mobiel als op kantoor snel aan de slag met de nieuwe oplossing 	

epic BE00009	Afhandelen Onregelmatigheden			
	<ul style="list-style-type: none"> gegevens uit oude systemen zijn veiliggesteld, en oude systemen en lokale oplossingen zijn uitgefaseerd 			
risico's	<ul style="list-style-type: none"> Beperkte ontwikkelcapaciteit op gebied van BPM Complexiteit van de huidige applicatie en procesinrichting kan de nieuwe ontwikkeling negatief beïnvloeden Extra complexiteit door noodzaak om zowel het AVG als ook WPG regime adequaat te ondersteunen 			
omvang	XL	Het proces Afhandelen Onregelmatigheden is een complex proces met raakvlakken met een groot aantal andere Douane processen en processen en applicaties buiten de Douane.		
	doorlooptijd	kosten	startdatum	einddatum
MVP	3	600 dagen	PI-14	PI-16
restant	2	400 dagen	PI-17	PI-18

epic BE013 Digitaliseren Teruggaaf Accijns en Verbruiksbelastingen

voor	burgers en bedrijven en medewerkers van de Douane
die	klantverzoeken "teruggaven accijns en verbruiksbelastingen" indienen en belast zijn met de afhandeling daarvan
is nodig	een oplossing voor het kunnen indienen en afhandelen van verzoeken teruggaaf van accijns en verbruiksbelastingen
zodat	burgers en bedrijven <ul style="list-style-type: none"> verzoeken digitaal kunnen indienen op de hoogte gehouden worden van de status van de afhandeling genotificeerd worden als er relevante wijzigingen zijn en medewerkers van Douane <ul style="list-style-type: none"> geautomatiseerd ondersteund worden in de beoordeling, tarifiering en uniforme afhandeling van het verzoek een laagdrempelige voorziening hebben die eenvoudig te gebruiken is

Epic value statement for 'Excise Refunds':

doelstellingen	●●●●●	Ordelijk Financieel Beheer
	○○○○○	Implementatie DWU / MASP
	○○○○○	Wet- en regelgeving
	○○○○○	Samenwerken en Regie

	●●●●○	Douane Digitaal	
	●○○○○	Versterken Toezicht Keten Douane	
	○○○○○	Versterken Fundament	
	●●●●●	Technische Kwaliteit	
verwachte uitkomsten	<ul style="list-style-type: none">• de communicatie tussen burgers / bedrijven en de douane verloopt voor 97% digitaal eind 2018• het aantal “foutieve” uitbetalingen is geminimaliseerd• er wordt niet tot uitbetaling overgegaan als er nog invorderbare schulden voor de indiener openstaan• er wordt uitbetaald op het rekeningnummer (BRG) van de indiener van het teruggaafverzoek		
indicatoren	<ul style="list-style-type: none">• aantal klantverzoeken op jaarbasis dat digitaal wordt ingediend• totale omvang van terug te geven bedragen accijns en verbruiksbelasting• het aantal “bekende” en “onbekende” indieners• gegevens uit oude systemen zijn veiliggesteld, en oude systemen en lokale oplossingen zijn uitgefaseerd• er wordt actuele (be)stuur(lijke) informatie opgeleverd waarmee interne controle mogelijk is		
risico's	het ontbreken van een (geautomatiseerde) verrekeningsfunctionaliteit met Inning van Belastingen		
omvang MVP 2 PI's	kosten MVP	startdatum april 2018	einddatum

Appendix C: Stakeholders

The table below contains all stakeholders.

From left to right, the columns contain:

1. Stakeholder: Role, function or indication of organizational unit;
2. Stakeholder answer to: To whom the stakeholder answers in hierarchy, if known;
3. Expected EAM involvement: The expected involvement of the stakeholder with Enterprise Architecture Management, on a scale of 1 – 10 ;
4. Stakeholder organization: The organizational circle to which the stakeholder is assigned (internal, external, societal);
5. Stakeholder classification: The stakeholder classification, assigned a number from 1 – 7 corresponding to:
 1. Stakeholder can impact project, low (internal) engagement;
 2. Legitimate stakeholders, little to no (internal) engagement;
 3. Vocal and (indirect) influential stakeholders, low (internal) engagement;
 4. Stakeholder with power and legitimacy, but low (internal) engagement;
 5. High power, high urgency, but no legitimacy, but internal engagement might be required;
 6. High urgency and legitimacy and engagement might be required;
 7. Core stakeholders to be managed and engaged with;

In case the stakeholder satisfied the following conditions:

6. Stakeholder organization contains: 'Internal';
7. Stakeholder classification is either 5, 6 or 7;

Then the column 'Stakeholder group' is filled. The stakeholder is thereby selected as an interview candidate.

Stakeholder	Stakeholder answers to:	Expected EAM involvement 1- 10	Stakeholder organization	Stakeholder classification	Stakeholder group
European Union	-	0	Direct	4	
European Commission	EU	1	Direct	4	
Dutch Government	EU	1	Direct	4	
Ministry of Finance	Dutch Government	1	Direct	3	
Dutch Tax Administration	Ministry of Finance	6	Direct	5	
Dutch Customs	Tax Administration	10	Direct	5	
Business owner	Dutch Customs	7	Internal	7	Operational Processes
Chain director	Department for Strategy	10	Internal	7	
Business analyst	Portfolio team	10	Internal	7	

Stakeholder	Stakeholder answers to:	Expected EAM involvement 1- 10	Stakeholder organization	Stakeholder classification	Stakeholder group
Enterprise architect	Dutch Customs	8	Internal	7	Law & legislation
Portfolio manager	Dutch Customs	8	Direct	6	
Skill management	Dutch Tax Administration	0	Internal	1	
Policy Enforcement Unit	Customs National Office	8	Internal	7	Law & legislation
Team for Oil and Gas	Customs National Office	1	Internal	1	
Team for Large Entrepreneurs	Customs National Office	1	Internal	1	
Department Coordinators	Chairman of the Coordination Group	7	Internal	6	Operational processes
Regional Offices	Customs National Office	7	Internal	2	
IT Architect	Chain-team	7	Internal	6	IT Department
Department for Strategy	Dutch Customs	10	Internal	3	
Coordination group	Policy Enforcement Unit	5	Internal	3	
Core-excise group	Business owner				
Ledger	Chain-team	0	Internal	1	
(legal) Natural persons		0	Societal	-	
(legal) Natural foreign persons		0	Societal	-	
Companies with Customs license	Customer manager	0	Societal	-	
Companies without Customs license	Customer manager	0	Societal	-	
Form-owners	Coordination group	3	Internal	4	
Product owners	Chain-team	2	Internal	1	
Process designers	Product owner	1	Internal	1	
Subject matter expert IT	Product owner	5	Internal	1	
Application servicing	Team manager	0	Internal	1	

Stakeholder	Stakeholder answers to:	Expected EAM involvement 1- 10	Stakeholder organization	Stakeholder classification	Stakeholder group
End-users	Department coordinator; manager	0	Internal	1	

Appendix D Framework document for guiding interview

Introduction about research model and EA for the interviewee:

Context and introduction:

- Indicate personal involvement;
- Explain research objective, research context and main research question;
- Explain interview procedure;
- Ask permission to record;
- Explain the key terms EA, EAM;

Standard general questions:

- What is your name?
- What is your role within the organization?
- How are you involved in the excise domain concerning managing the changes in the domain through epics?

Interview question #	Variable	Question
1	Interoperability	What cultural aspects are known to you that hinder the organization in managing its EA? Think of practical examples that go wrong.
2	Interoperability	What are technical aspects that hinder the effective functioning of operational processes? Think of information that is not readily available or accessible.
3	Interoperability	Are there architectural standards for information exchange or technical solutions?
4	EA as a product	Is the EA documented as a product? Is this unambiguously linked to a target state?
5	EA as a product	Do strategic products sufficiently take your requirements and or interests into account?
6	EA as a product	What, according to you, are the primary concerns when it comes to the organization as it is now, in light of its operational processes?
7	Public sector	How does the organization ensure it is compliant with law and & legislation?
8	Public sector	What role does continuity play in managing the enterprise?
9	Public sector	What recurrent themes is the organization subject to?
10	EA as a process	Are you involved in initiating change? How does strategic change relate to operational change?
11	EA as a process	After a strategic initiative has taken off, what is your role, input and influence in its direction?
12	EA as a process	What is your role and influence on operational requirements that belong to a strategic project?
13	EA as a process	Is there a governance structure for strategic change? What is the governance structure to include operational requirements?

Interview question #	Variable	Question
14	EA as a process	How is operational change reflected in the enterprise's governance structure?
15	EA as a process	Are you familiar with the strategic goal 'x'? If so, you can explain to me what it means in general? If so, can you explain to me what role it plays in the excise domain?

Appendix E: Strategic objectives

Strategic goals of the TAAK-chain of Dutch Customs (on the left side in Dutch, on the right side the translation as maintained in this research paper);

Doelstellingen	Strategic objectives
Ordelijk Financieel Beheer	Orderly Financial Management
Implementatie DWU / MASP	Implementation CCU / MASP
Wet- en regelgeving	Law & legislation
Samenwerken en Regie	Collaboration and Direction
Douane Digitaal	Customs Digital
Versterken Toezicht Keten Douane	Strengthen Supervision of Customs-chain
Versterken Fundament	Strengthen Foundations
Technische Kwaliteit	Technical Quality

Each project that relates to the excise duties process has been scored by the Chain-management team in terms of the expectations concerning its contribution to achieving these above eight strategic goals.

Excise Duties Declarations	
●●●●●	Ordelijk Financieel Beheer
○○○○○	Implementatie DWU / MASP
●●○○○	Wet- en regelgeving
●○○○○	Samenwerken en Regie
●●●●○	Douane Digitaal
●○○○○	Versterken Toezicht Keten Douane
○○○○○	Versterken Fundament
●●●●●	Technische Kwaliteit

Rebuilding EMCS	
●○○○○	Ordelijk Financieel Beheer
○○○○○	Implementatie DWU / MASP
●●○○○	Wet- en regelgeving
●●○○○	Samenwerken en Regie
●●○○○	Douane Digitaal
●○○○○	Versterken Toezicht Keten Douane
●●○○○	Versterken Fundament
●●●●●	Technische Kwaliteit

Irregularities	
●●●○○	Ordelijk Financieel Beheer
●○○○○	Implementatie DWU / MASP
●●●○○	Wet- en regelgeving
●●●○○	Samenwerken en Regie
●●●○○	Douane Digitaal
○○○○○	Versterken Toezicht Keten Douane
○○○○○	Versterken Fundament
●●●●○	Technische Kwaliteit

Digitizing Excise Duties-refund	
●●●●●	Ordelijk Financieel Beheer
○○○○○	Implementatie DWU / MASP
○○○○○	Wet- en regelgeving
○○○○○	Samenwerken en Regie
●●●●○	Douane Digitaal
●○○○○	Versterken Toezicht Keten Douane
○○○○○	Versterken Fundament
●●●●●	Technische Kwaliteit

These four projects have are either general or at their core related to excise processes. The accumulated weight of the strategic goals are as follows:

Rank	Accumulated weight of strategic goals	
1	Technische Kwaliteit	19
2	Ordelijk Financieel Beheer	15
3	Douane Digitaal	13
4	Wet- en regelgeving	7
5	Samenwerken en Regie	6

Appendix F: Frequency and correlation of codes

Kwalitan was used to code the interviews. The following is the result of an export from the tool, wherein the frequencies and co-occurrences of codes are shown.

Kwalitan ·
13-02-2020 - 23:39:52 ·

Correlation of codes

Active reach : all workfiles
Range of search : all segments

Correlation data of codes

Number of codes involved: 12

Number of occurrences a code appears in combination with another code

Code	Frequency
ownership	95
ea as process: strategy	75
ea as process: tactical	68
law & legislation	68
technical quality	63
information fragmentation: cultural	45
orderly financial management	37
information fragmentation: it	36
policy and enforcement	33
ea as product	25
architecture governance	16
technocratic	15

Frequency of concurrence of codes

There are 276 possible combinations of code pairs.

There are	3	pairs, that appear	8	times in a segment.
There are	4	pairs, that appear	7	times in a segment.
There are	5	pairs, that appear	6	times in a segment.
There are	5	pairs, that appear	5	times in a segment.
There are	18	pairs, that appear	4	times in a segment.
There are	13	pairs, that appear	3	times in a segment.
There are	27	pairs, that appear	2	times in a segment.
There are	91	pairs, that appear	1	times in a segment.
There are	110	pairs, that appear	0	times in a segment.

Frequency: Occurrences by pair

Only pairs with a frequency of two or more are shown.

8	ea as process: strategic	en	ea as process: operational
8	ea as process: strategic	en	law and legislation
8	ea as process: operational	en	law and legislation
7	ea as process: strategic	en	ownership
7	ea as process: strategic	en	technical quality
7	ea as process: operational	en	ownership
7	law and legislation	en	ownership
6	ea as process: operational	en	technical quality
6	law and legislation	en	technical quality
5	ea as process: strategic	en	information fragmentation: cultural
5	ownership	en	technical quality
5	silos formation: cultural	en	technical quality
4	ea as process: strategic	en	orderly financial management
4	ea as process: strategic	en	policy and enforcement
4	ea as process: strategic	en	problem ownership
4	ea as process: strategic	en	information fragmentation: it
4	ea as process: operational	en	orderly financial management
4	ea as process: operational	en	policy and enforcement
4	ea as process: operational	en	ownership
4	ea as process: operational	en	information fragmentation: cultural
4	law and legislation	en	orderly financial management
4	law and legislation	en	policy and enforcement
4	law and legislation	en	ownership
4	law and legislation	en	information fragmentation: cultural
4	orderly financial management	en	ownership
4	orderly financial management	en	technical quality
4	policy and enforcement	en	ownership
4	information fragmentation cultural	en	information fragmentation: it
4	information fragmentation: it	en	technical quality
3	ea as process: operational	en	information fragmentation: it
3	law and legislation	en	information fragmentation: it
3	policy and enforcement	en	ownership
3	ownership	en	technical quality
3	ownership	en	information fragmentation: cultural

Appendix G: Text segments by code

Information deleted due to privacy concerns.

Appendix H: Interviews

Information deleted due to privacy concerns.

Appendix I: Glossary

Abbreviation	Term	Description
CNO	Customs National Office	Headquarter of Dutch Customs, responsible for Strategy and Law & legislation.
	Domain	In this research, a domain specifically refers to those organizational units that are part of an enterprise architecture that are collectively responsible for managing a set of business processes.
EA	Enterprise Architecture	State of affairs of an organization through relations between units, processes and information systems.
EAM	Enterprise Architecture Management	The manner in which an organization manages its enterprise architecture.
EU	European Union	Political body consisting of 27 European member states, the Council of the European Union, European Commission and the European Parliament.
	Excise declaration	After transport of excise products under suspension from one member state to another, a company is legally obliged to declare duties.
	Excise product	Excise products defined as luxury consumptions goods by a European directive, among which are oil, tobacco and alcohol products.
	Excise refund	After having declared excise duties in a target-EU member state, a company is eligible for a refund if duties were paid in a source-EU member state.
	Excise transport	A movement of an excise product under suspension in or between European member states.
	Information fragmentation	A concept applied to address if fragmented information in an organization forms a problem in EAM. Closely linked to interoperability in this research.
IS	Information systems	Applications that support staff in executing business processes.
IBS	Integrated Business Services	The IT Department of Dutch Customs.
	Interoperability	A means of looking at how information is exchanged on organizational, cultural and technical levels. (Interoperable, integrated, isolated).
	Irregularity	Any breach or infringement on Dutch or European law as observed by Dutch Customs.
PEU	Policy Enforcement Unit	The organizational sub-unit of Customs National Office responsible for legal principles and guidelines.
RO	Regional Office(s)	The offices of Dutch Customs responsible for enforcing legal policies.

